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THE

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FRANCIS BENJAMIN THOMPSON.

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WILLIAM GIBBS.

"Every man will now, forsooth, compose after his own fancy, and conceives that to imitate them [the ancients] were to become an apprentice again; and that to be masters, indeed, they must of necessity produce something of new. Poor men that they are to believe that in fantastically designing some one kind of particular cornice or like member, they are presently the inventors of a new order, as if in that only consisted what is called invention; as if the Pantheon, that same stupendous and incomparable structure which is yet to be seen at Rome, were not the invention of the architect who built it, because he has varied nothing from the Corinthian order, of which it is entirely composed."

JOHN EVELYN.

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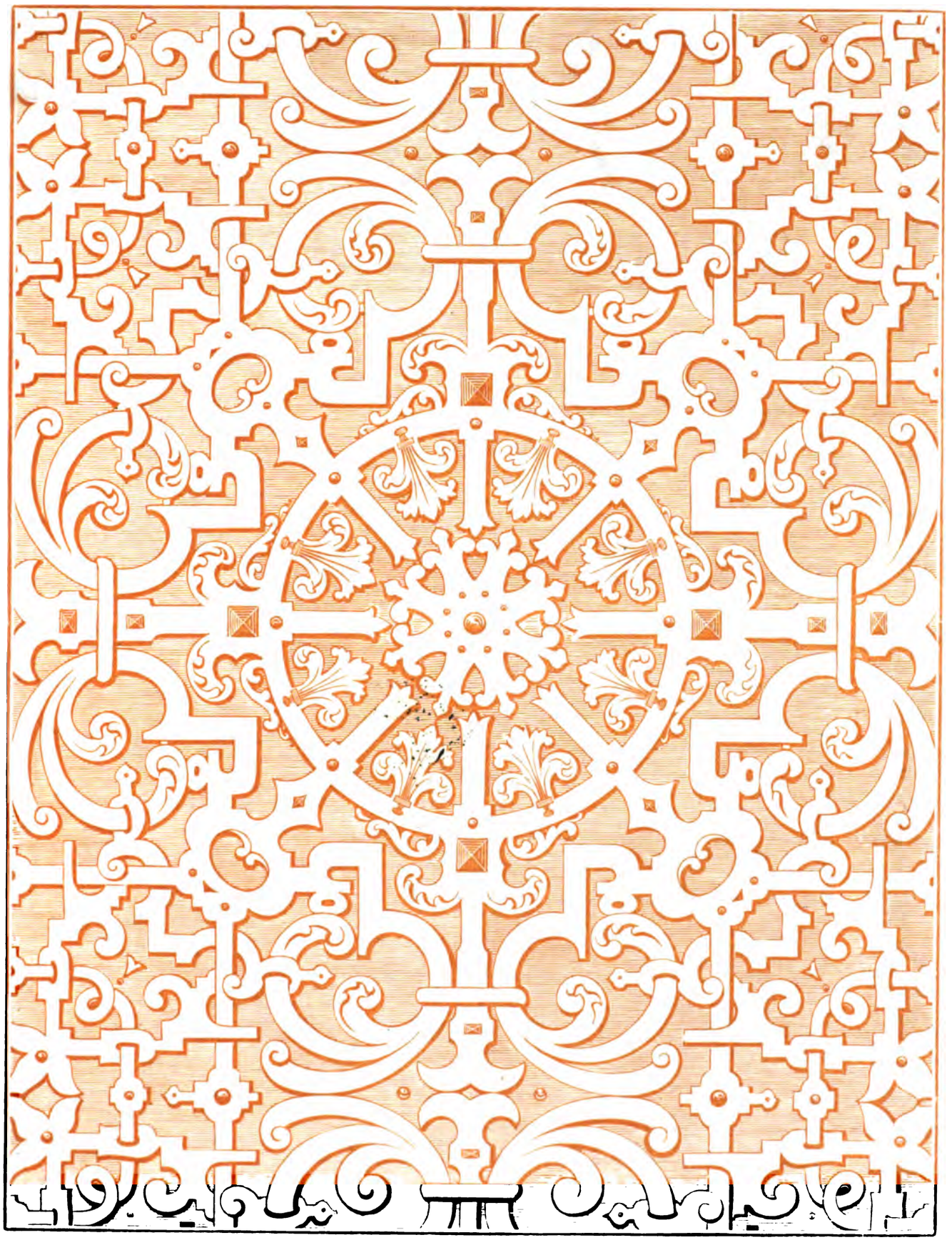


CEILING—ELIZABETHAN

Universal Decorator.

Rules of Art.

LIKE the poet and the orator, no rules whatever are capable of making an excellent artist, because the quality necessary to form one depends on the natural disposition, the fire of genius, which no human art can confer, but which is the gift of heaven. Rules, however, will prevent a man from being a bad artist, a dull orator, or a wretched poet; seeing they are the reflections of the greatest masters in those arts, and that they point out the rocks which the artist should shun in the exercise of his talents. They are also of use in facilitating his labours, and in directing him to arrive by the shortest and surest road to perfection. They refine, strengthen, and confirm his taste. Nature, abandoned to herself, has something wild. Art, founded on just rules, gives her elegance and dignity. These general rules are of no great number. The first is, that whoever would devote himself to the polite arts, should above all things consult his genius. This precept has been often applied to poetry, but it is equally applicable to all the polite arts, in each of which a man's most happy success depends upon imagination. By this term we understand, in general, a faculty of the mind, a particular genius, a lively invention, a certain subtle spirit, which gives a facility in discovering something new. But it is necessary also to prescribe just bounds to this term *new*, which must not be here taken in an absolute sense. Solomon remarks that, even in his time, "there was nothing new under the sun." The fine arts in their imitations of nature, in their expressions, can borrow images, figures, comparisons, from those things only that exist and are known. But the novelty, of which we here speak, consists in the ingenious use of combinations of all the various objects of nature that are new, happy, and agreeable, that have not yet been exhausted, and which appear even to be inexhaustible; and of the use which the artist makes of all new discoveries, which he turns to his advantage by a judicious application. Invention therefore supposes a considerable fund of preliminary knowledge, such as is capable of furnishing ideas and images, to form new combinations. But there is no art by which invention itself can be produced; for that gift of heaven is an endowment, which even those possessed of it cannot always use at pleasure. We would rather say, therefore, that invention consists in producing, in works of genius, *that which is unexpected*; an object, a harmony, a perfection, a thought, an expression, of which we had no idea, that we could not foresee, nor hope to find, where the artist has so happily placed it, and where we perceive it with delight. This idea appears applicable to such of the polite arts as affect the mind by the hearing as well as by the sight; and it is a matter that is highly essential. The second rule is, that every artist ought incessantly to labour in the improvement of his taste, in acquiring that refined and clear discernment, by which he will be enabled to distinguish the real beauties in each object, the ornaments that are agreeable to it, and the proportions that subsist among the several parts: and by this faculty he will be regulated in the employment of his natural talents. This labour consists not only in the profound reflections he will make on the properties of objects as they relate to the fine arts, but also in a constant assiduous study of the grand models of beauty. The third rule to be observed in the practice of the polite arts is *the imitation of nature*. Every object in the universe has its peculiar nature, of which the artist should never lose sight in his manner of treating it. In vain will he otherwise ornament his work with the most refined and most brilliant strokes; for, if nature be not justly imitated, the work will for ever remain imperfect. Homer himself has sometimes sinned against this rule. Not to mention the ridiculous and unnatural passions attributed to his deities (wherein the general belief of the Grecian mythology might perhaps justify him), it was surely not imitating Nature to put into the mouth of a hero, at the moment of a decisive battle, a harangue tedious by its excessive length, and which certainly could not have been heard by the thousandth part of a numerous army. Indeed the imitation of nature, which appears at first view so simple and so easy, is of all things the most difficult in practice; and it requires a discernment so sagacious and an expression so happy, as is rarely bestowed on mortal man. Perspicuity forms the fourth rule of expression. In all the fine arts, an obscure, perplexed, ambiguous, and elaborate expression, is always bad. The true striking beauty must be manifest and perceptible to the most ignorant of mankind as well as the most learned. Those are ever false or inferior beauties that have occasion for a covering, a kind of veil that may make them appear greater than they really are; true beauty wants no veil, but shines by its native lustre. From the union of the true imitation of nature with perspicuity of expression arises that truth which is so essential in the productions of the fine arts. In all the polite arts, and in all the subjects they embrace, there must necessarily reign an ele-

vation of sentiment, that expresses each object in the greatest perfection of which it is susceptible; that imitates nature in her most exalted beauty. This makes the fifth general rule. The design of the fine arts being to excite pleasure by the expression of that which is beautiful, every artist should raise himself above his subject; and, choosing the most favourable light wherein to place it, should there embellish it with the greatest, most noble, and beautiful ornaments, that his own genius can suggest; still, however, observing a strict imitation of nature. Sixthly from the observation of these two last rules results the SUBLIME, which is the union of the greatest perspicuity with the strictest truth and most exalted elevation possible.

ORNAMENTAL ALPHABETS.

Alphabetic ornamentation is an interesting branch of the decorative art, and from the shape of letters we can generally pretty well guess the material in which they were first inscribed by the nation by whom they were adopted. So the angular Roman, straight, heavy, and stable, seems intended to be cut in the keystones of aqueducts and triumphal arches,—the fluent-like Persian and Italian are hands first used on paper,—the slow Gothic is for parchment,—the Coptic is a reed pen hand,—the German is for a goose-quill. Then there are peculiarities about some of the old alphabets. The M is a Greek Omega; the small M and N are not alike, as with us, to our great confusion, but the I and J. The ninth century, with clumsy playfulness, ornaments its letters by waving flags and pennons. The tenth grows clearer, and twists its tails like vine tendrils, only with little re-duplicated geometric shapes; its capital H is only a small h enlarged; its I and J grow distinct and are permanently divorced; its model seems to be carpenter's work and slips of wood nailed together; its curves are its exceptions. The eleventh century binds ferns and flowers into wreaths and scrolls; it is wild, playful, and redundant; its recesses and nooks are diapered; it shoots out lily stems and blossoming branches; the letters are so many fructifying Aaron's rods. The twelfth century grows quainter and stubborner, bending in strong reluctant curves, as if its contrivers were thinking of ecclesiastical ironwork; it seems cut out by sword-strokes and hammer-blows. The thirteenth century gets capricious, and pierces out quatrefoils and such emblematic loopholes for light. The fourteenth century, the vintage time of fancy, fills its whole background with flowery tracing; it is as showy and individual as our modern hands are dull, monotonous, and indistinct. Letters were not then mere blots and ciphers, but works of Art, designed for individual purposes. Then came the Roman Revival and the lavish and debasing mixture of band and scroll and cabbage leafage, eclipsing the letter and overwhelming the eye. From the clear, incisive, muscular letters of the fifteenth century to the plain Roman capitals which we borrowed at starting, is indeed a step. Of course the free invention of the monks was never trammelled by the necessity of using a character intelligible at once to the ignorant public.—*Athenæum.*

CORRESPONDENCE—"G. J. C. D." (Westminster), "M. S." (Hull).—Directions have been already given. Consult the Index of Vol. I.—"G E. R." (Hull).—Directions for mixing all kinds of paints will be given very shortly.

DESIGN FOR A BRACKET.

Art in England.

The true fountain of British art arose in the 18th century. Religious painting of some sort or other was introduced by St. Benedict Bisiob, the friend and early preceptor of the venerable Bede. He ornamented the church of Wearmouth with the Visions of the Apocalypse. Henry the Third founded many cathedrals, and enriched them with sculpture and painting to an extent and with a skill that merited the commendation of Flaxman. The royal instructions of 1233 are curious, and inform us of the character of art at that remote period, and of the subordinate condition of its professors. In Italy, indeed, as well as in England, an artist was then, and long after, considered as a mere mechanic. He was commonly at once a carver of wood, a maker of figures, a house and heraldry painter, a carpenter, an upholsterer, and a mason; and sometimes, over and above all this, he was a tailor. When the arts were reviving in Italy, England, occupied with foreign and domestic wars, oppressed in her trade, exhausted in her treasury, devoted to ruin, expense, and senseless ostentation, profited not by the example. Italy exported bulls and legates *a latere*, but kept the painters at home; yet, in the age of Chaucer, a great artist would not have been neglected. The third Edward was magnificent; his unfortunate grandson was profuse. John of Gaunt was the patron of Chaucer, but whether as poet or painter does not appear. Richard II. noticed Gower. What "art there was, lack'd not encouragement." Painting partook of the warlike spirit of the time, and became martial instead of

religious. But a passion for gilded banners and surcoats of arms is not a taste for art. St. Edward is as good a subject as St. George; and the wiverns of heraldry are as far removed from *la belle nature* as the dragons of the Apocalypse. In fact, kings and princes cannot make artists, they can only employ and pay them; and mere pageantry is so far from art, that it hardly implies civilisation. Well does Milton speak of "barbaric pearl and gold." The spirit of art is proud, and brooks not the condition of a pampered menial; hence, though it may spring, and grow, and flourish amid war and tumult, and even survive under a despotism—under a military aristocracy, it scarce can lift its head. It must be loved, honoured, esteemed for its own sake—not fed, flattered, and despised. The knights and barons bold might be liberal, as the better kind of thieves generally are, to the minstrels who lauded their vices, and would have rewarded the limner who could emblazon images of blood or sensuality, as well as the *largitores rapinæ* commonly reward the instruments of their pleasures; but they cannot confer dignity. In the year 1526 Holbein arrived in England, and for the first time our dear little isle entertained a great painter. He was a native of Basle; but finding the salubrious influences of native air counteracted by an over-rating wife and an under-rating public, he came to the court of bluff King Harry. His first English patron was the Earl of Arundel—a title to which art owes something, and chronology more.

Hans is commonly regarded as a literal prosaic portrait-painter, who drew correctly what he saw, but saw only with every-day eyes, and made a dead map of the human countenance—devoid of all that makes beauty charming, or irregularity characteristic. Those who have seen his "Dance of Death" will not readily believe that he wanted invention. He who could impart expression to a skull, and intellectual interest to all varieties of corruption, could scarce be a mechanical matter-of-fact person. Neither is it true that his portraits are without meaning, though they may not be distinguished for grace. Holbein died of the plague in 1554.

Little as genuine art was cultivated or encouraged under Elizabeth, portrait, which, in strict speech, is historical, contradistinguished from poetical, painting was not neglected. The features of most of her worthies, warriors, statesmen, poets, and divines, have been recorded with fidelity, or at least with much verisimilitude.

Another race of visages came in with the Restoration, and yet another with the House of Hanover. We are ourselves a fourth; but this is anticipation. Who were the artists who pourtrayed the luminaries of the Maiden reign, is not exactly recorded. As economy was the order of the day, few foreigners seem to have been tempted across the Channel. We read, however, of one Lucas de Heere, a native of Ghent, a poet, a painter, and wit, who visited England, and executed several portraits. He was employed to paint the gallery of the Earl of Lincoln, in which, among other allegorical emblems of nations, as the representative and express image of Anglicism, he drew a naked man, with a pair of shears, and various coloured cloths! His witticism, which is manifestly descended from the ass and trusses of hay, was borrowed from Andrew Borde's Induction to Knowledge, prefixed to which is the figure of an English Adamite, with these lines:—

"I am an Englishman, and naked I stand here,
Musing in mind what garment I shall wear."

Hilliard, Oliver, and Cooper, are the first native names that occur in the list of British artists. They were all miniature painters; and may have preserved the lineaments of men whose deeds are recorded in history, or their minds impressed upon works of their own. Miniature occupies about the same station in art that sonnet obtains in poetry—exquisite finish, softness, and brilliance, are essential to both, and perhaps portability is the best property of either.

The Stuarts, an ingenious but unhappy race, were cultivators and encouragers of the arts and intellect. Even the unfortunate favourites of James III., though described by historians as low artisans, were probably liberal artists. Cochrane, who is called a stone mason, might be an architect. Rogers was a skilful musician, and doubtless a poet, like his namesake. The very name's a poet. Leonard was a smith; but so was Benvenuto Cellini. He was no maker of hobnails, but a deviser of curious articles in metal—and perhaps, had he lived, and Homer been translated, would have copied the shield of Achilles. Hommil, the tailor, was a sculptor and painter, who exercised his taste and ingenuity in contriving costumes.

Passing over the reign of the learned and pacific author of the Counterblast to Tobacco—we find a truly loyal patron of art in his unfortunate successor. Whether Charles could have made England a country of painters, may be doubted; for to create genius, is a higher prerogative than he ever assumed; but he certainly did his best to make his court a domicile of artists, and his palace a conservatory of pictures. Considering how, even in his peaceful days, he was straitened for money, it is wonderful how much he did—and while his political friendship was worth purchasing, foreign states assiduously paid homage to his taste,—and instead of ivory puzzles and diamond snuff-boxes, the usual free-will offerings of diplomacy, presented him with Tintorets and Titians. But Catholic artists were slow in accepting his invitations, nor is it surprising that they shunned a country where the multitude were taught to consider their genius a crime, and where their religion was a statutable offence. Yet Rubens, protected by the sacro-sanctity of an ambassador, partook awhile of his hospitality, and adorned Whitehall with the apotheosis of James the First. Rubens was the Claudian of painters—the pictorial laureate; the splendour of his colouring and the vigour of his design, disguises the nothingness of his subject. His pictures put you in mind of a vast parterre of thick-set carnations and anemones—a glowing *brochure* of double daisies. Every thing is rich and voluptuous, but all seems overfed and forced.

VENEERING.

In the time of Pliny the art of veneering was a recent invention, and he descants, in his usual antithetical way, on thus converting the cheaper into the most valuable woods by plating them with these latter, and of the ingenuity of cutting a tree into thin slices, and thus selling it several times over. The woods employed for this purpose were the citrus, the terebinth, various kinds of maple, box, palm, holly, ilex, the root of elder and poplar. The middle part of a tree, he observes, shews the largest and most curling veins, while the rings and spots are chiefly found near the root. The veneers, or plates, were secured, as at present, by strong glue.

Technicologia.

105. *To obtain finely powdered Pigments, &c.*—For this purpose a tall upright box, supported on four legs, should be used. The bottom is to be taken out and a piece of leather nailed securely on it, which, being larger than the bottom, hangs down like a bag. The upper part of the box is furnished with trays, at intervals of a few inches, from the top to the bottom, and supported on ledges, but not extending entirely across the box. The powder, as it comes from the mortar, is to be placed in the bag, which is to be beaten with a stick from below. The particles will naturally rise in the box and fall on the trays, which may be removed and emptied as occasion requires. The powder will not be of the same fineness on all the shelves; it will be finer on the top than on the bottom.

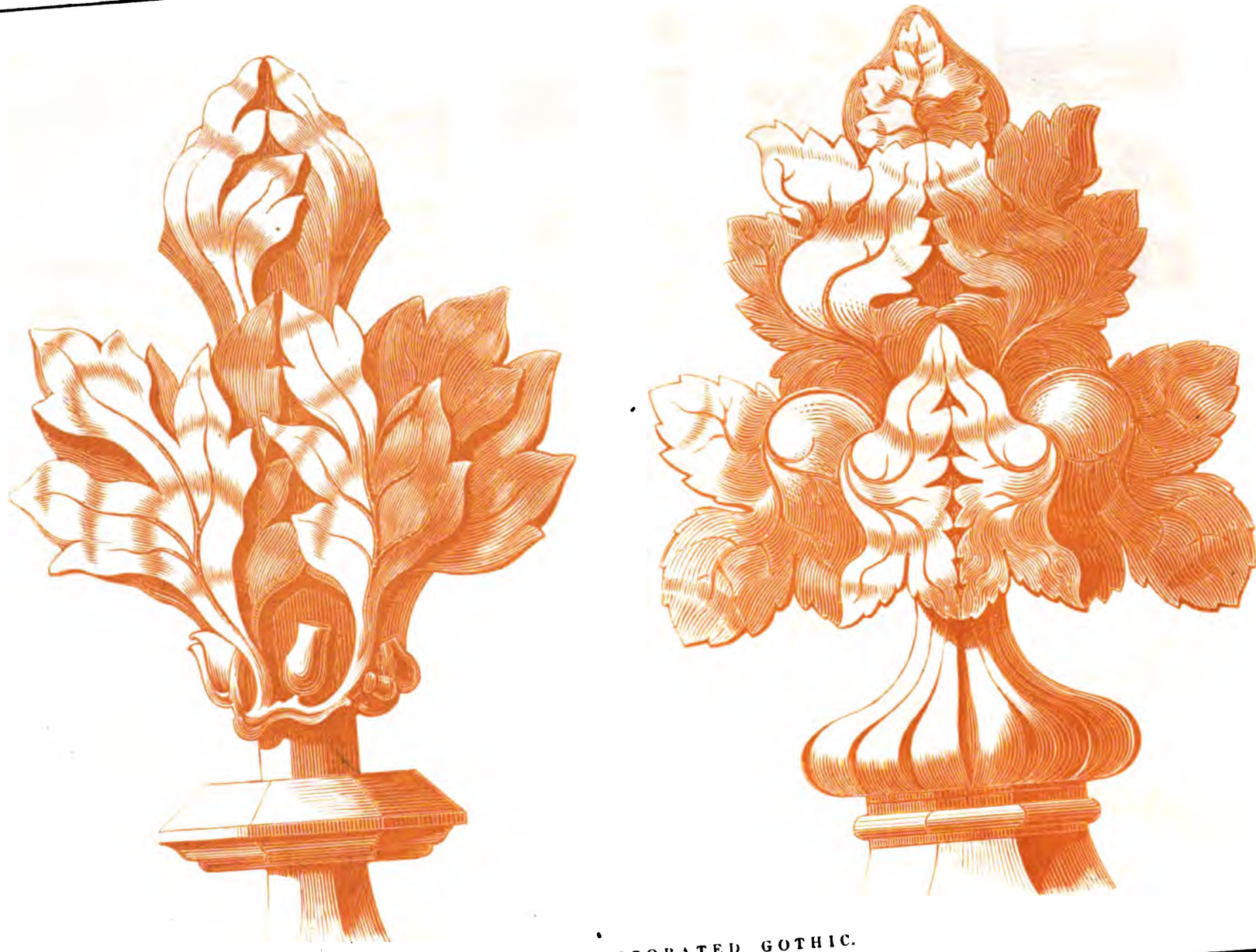
106. *Lyon and Milwards' Patent for Designs on Metallic Surfaces.*—To produce a design on copper, if it is required to be in relief, the copper is to be first gilded with a thin surface of gold, and on this gilded surface the pattern is to be traced or stencilled with copal varnish; the copper roller or plate is then placed in a solution of cyanide of potassium (made by dissolving one pound of the cyanide in a gallon of water), and connected with the battery till all the gold, except that protected by the varnish, is removed; it is then put into a solution of nitrate of silver, made by dissolving one ounce of silver in one ounce of nitric acid and two ounces of water, and retained in this solution till the engraving is sufficiently deep, it is then removed and the varnish washed off with caustic potass, when the design will be found in relief. If the design is required to be engraved, then the design is first traced on the copper surface with varnish, and when dry, the uncoated part is gilt; the varnish is then removed as above, and the design eaten in with the nitrate of silver solution. Instead of nitrate of silver, a dilute solution of nitric acid may be employed. In producing designs upon tin, Britannia metal, or type metal, instead of coating the surface with gold, the patentee prefers to use copper (the solution in cyanide of potassium); if the design is to be in relief, the metal is first coated with copper, and then the design traced with copal varnish; when dry, it is immersed in a solution of cyanide of potassium till the unprotected copper is dissolved off, and then the metal is connected with the battery and immersed in a solution of sulphate of copper, containing a little nitrate of copper or free nitric acid, till sufficient of the metal has been removed. But if the design is required to be sunk or engraved, then it is first traced on the metal with copal varnish, and then the bare surface coated with copper in the cyanide solution; the varnish is then removed, and the metal immersed in the solution of sulphate of copper till the design is eaten in sufficiently deep. When the design is to be produced in relief, on the surface of gold or silver, the patentee first coats the surface with iron from a solution of that metal in cyanide of potassium, and then traces the design with copal varnish; it is then immersed in sulphate of iron, and the unprotected part of the iron removed, and then, by immersing it in cyanide of potassium, the gold or silver surface may be eaten away to any required depth; the varnish is then washed off, and the iron (which covers the design) removed in the sulphate of iron solution. If the design is required to be sunk or engraved, it is first traced on the gold or silver with copal varnish, and then the exposed part is to be coated with iron as above described; the varnish must then be removed and the metal immersed in the cyanide of potassium solution, till the design is of a sufficient depth.

Heraldic Blazonry.

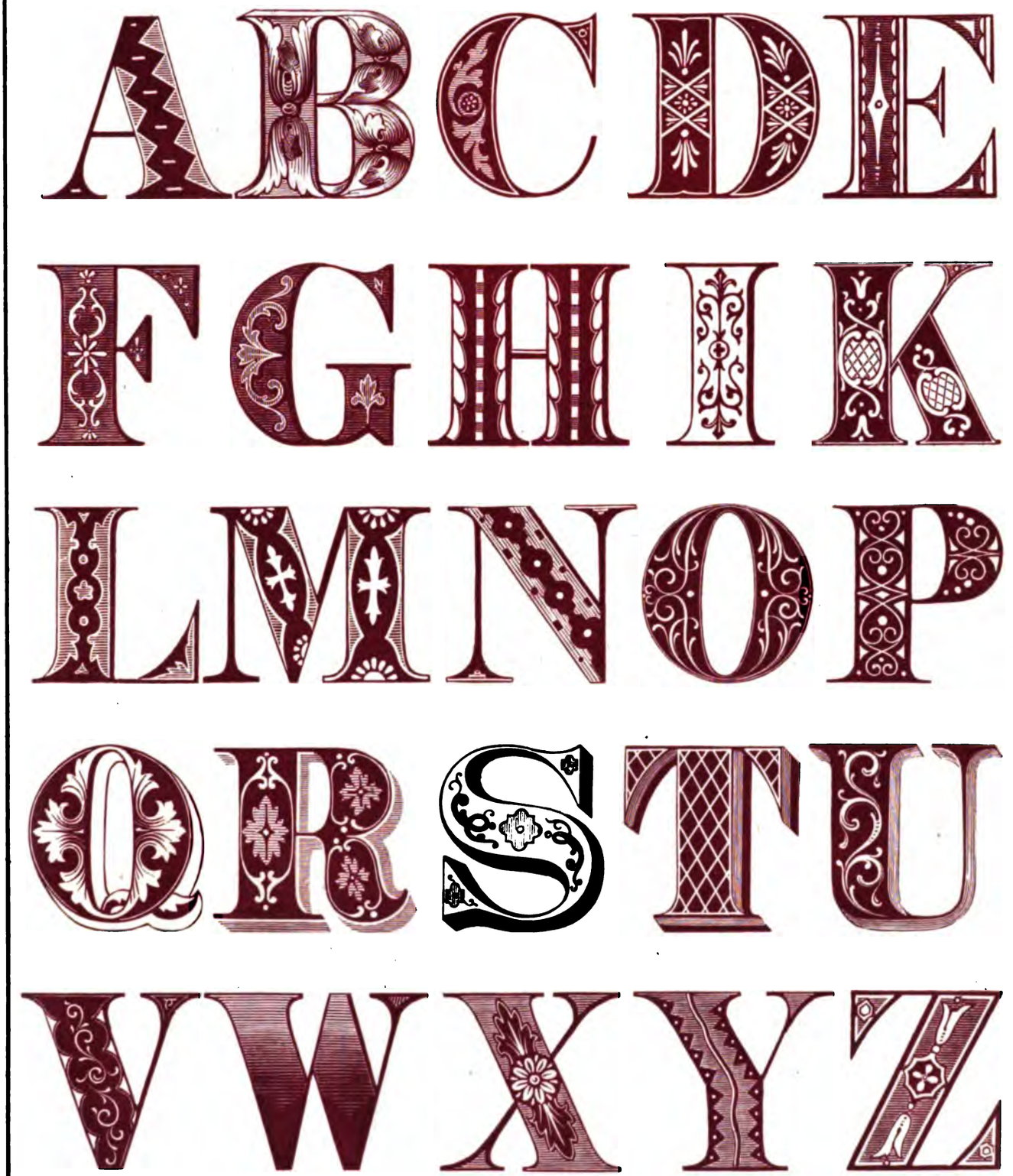
In commencing a succinct treatise on this branch of knowledge, so important to most artisans who have to deal with ornamental designs, we must premise that we have no intention of entering upon its history, or interfering with those controverted points which occasionally disturb the equanimity of antiquarian research. Our object is to elucidate, as far as possible, the true meanings and proper dispositions of those heraldic bearings which every day require to be painted, carved, or engraved, so as to prevent anachronisms, which are at present a too common cause of complaint.

It appears that the banner claims a higher antiquity than the common heraldic escutcheon, the earliest form of which is known as the heater or Norman shield, that is, a shield with a plain pointed base and square head. The shape of the banners was considerably varied, but two descriptions were very early used—the banner proper, or drapeau quarreé, and the pennon (called likewise penecel or guid'homme), the latter having very long and divided streamers. Each of these banners were displayed on the point of a lance. The real warlike shields eventually underwent many alterations in their shapes, and yet still more were the architectural modifications of the escutcheon. Of warriors' shields emblazoned with arms, says Dallaway, although they were of extreme cost and elegance, an original "will be sought for in vain in the most extensive and curious cabinets;" and Lower observes, in his "Curiosities of Heraldry," that "In the ages immediately subsequent to the Crusades, heraldic ensigns began to be generally applied as architectural decorations. The shields upon which they were first represented were in the form of an isosceles triangle, slightly curved on its two equal sides; but soon afterwards they began to assume that of the Gothic arch reversed, a shape probably adopted with a view to such decoration, as harmonising better with the great characteristics of the pointed style. Painted glass, too," adds this industrious author, "in its earliest application, was employed to represent military portraits, and arms with scrolls containing short sentences, from which family mottoes may have originated. Encaustic tiles, also, which were introduced in the early days of heraldry, afforded another means of displaying the insignia of warriors. They are still found in the pavements of many of our cathedrals and old parish churches." Berry, in his "Enclyclopædia Heraldica," gives other causes for the varieties of escutcheons introduced, stating that "The shield upon which the various devices of heraldry are depicted, has varied in shape with the caprice of the times, as the fertile imaginations of whimsical heralds, engravers. and painters have suggested, but seldom bearing any very near resemblance to the shield of the warrior actually used in the field of battle, single combat, or tournament."

(*To be continued.*)



FINIALS—DECORATED GOTHIC.



ORNAMENTAL ALPHABET—ROMAN.

Mr. Layard on Perugino.

EARNEST and profound thought characterises the following able description by Mr. Layard of a recently discovered painting by Perugino:—

"On one of the wooded hills rising above the lake of Perugia stands the small town of Panicale. Outside the walls, on an olive-clad eminence overlooking the town, is a convent of nuns. Attached to it is a chapel dedicated to S. Sebastian. The wall behind its high altar is covered with a fresco representing the martyrdom of the Saint. It is the work, and may be ranked amongst the finest, of a painter who, by his genius, and the influence he exercised upon his great contemporaries, forms an epoch in the history of Art—Pietro Vannucci, or, as he is more commonly called, from the city in which he principally laboured and founded his school, 'Il Perugino.' This noble work, although mentioned in most lives of the painter, is unnoticed by his first biographer, Vasari. It has consequently been overlooked, even by those who have made the history of the art of his period a study. My attention was first called to it by the Count Giancarlo Conestabile, a nobleman of fine taste and extensive knowledge, under the protection of whose ancestors Pietro himself painted, and who still proudly keeps, as the best heirloom of his family, one of Rafaële's earliest and most lovely conceptions, the 'Staffa Madonna.' After examining most of the principal frescoes in central Italy, I was surprised at the condition in which I found this painting. Although the highest development of the genius of the early Italian painters is to be found in their frescoes, of all their works they are those which have unfortunately suffered the most. Usually painted in the side-chapels or behind the principal altars of churches, they have been exposed to many sources of injury. The ill-repaired roof and walls admit the rain and damp. On festivals tawdry hangings are unmercifully nailed over them, the hammer and the ladder each having its share in the process of destruction. Then torches blaze round the shrine and blacken the walls during the sacred ceremonies. But neither the fumes of incense nor the smoke of candles have dimmed this master-piece of the Perugian painter. The colour is still as bright and transparent as when first laid on the damp plaster, retaining that brilliancy which distinguishes true fresco-painting. The only injury the picture has sustained has been caused by large nails driven into the wall to suspend a veil with which it has been deemed becoming, as the chapel is attached to a convent, to cover the nude figure of the saint. Of the numerous works of Pietro Perugino, I scarcely know one that displays to greater advantage the peculiar characteristics of the master, the delicate tenderness of his colouring, the grace, verging on weakness, of his forms, the exquisite purity and sentiment of his heads, the general correctness of his drawing, and his somewhat scattered composition. It has all the best qualities of the Umbrian School, inherited by Pietro from his first instructors in the Art, Benedetto Bonfigli, of Perugia, and Niccolò Alunno, a native of Foligno, whose altar-pieces, remarkable for their glow of colour, and the simple beauty of their holy groups, still adorn the churches in the valley of the Tiber. But in it Pietro shews, at the same time, that he had been imbued with the spirit of that great school which flourished in Florence, and whose teachings he had early sought. It has less of his weakness and mannerism, and more of his strength, than most of his paintings, displaying those qualities which the genius of his immortal pupil at once culled from his works. The martyr occupies the centre of the composition, and forms the principal object in it. He is bound to a porphyry column raised on a pedestal. The exquisite proportions of the figure, the admirable delineation of all its parts, shew the study devoted by Pietro to the human form. The tender expression of devotion in the upturned head, slightly inclined over the right shoulder, is peculiar to the school, but does not in this instance degenerate into affectation. The painter has united in this beautiful figure, without exaggeration, the utmost grace with the deepest religious feeling. A more perfect and touching representation of the Christian martyr could not be conceived. Wrapped in the contemplation of the holy vision of the Eternal Father, surrounded by angels and cherubim floating in the clouds above him, he shews no sense of bodily pain. That the spectator may alone contemplate the divine resignation of the saint, the instruments of torture are kept as much as possible out of sight. How different this treatment of the subject from that of Pietro's contemporaries and of the earlier painters, who, by violent contortions of the body and countenance, or by a multitude of arrows and streams of blood, sought to represent the physical sufferings of the victim! How different, too, from that of the later masters, who chose a holy theme for mere anatomical display, and to prove their knowledge of the tricks of a school! Even the executioners seem to have imbibed the spirit of the Christian hero, and to perform their duty with melancholy tenderness. The heads of the archers are of singular beauty and grace—reminding us of Rafaële. This resemblance is still further carried out in their attitudes and forms, and in the bright clear colouring. Two groups of spectators, sketched in that free and graceful manner peculiar to Pietro, occupy the background, and serve to complete the composition. The scene of the martyrdom is represented in a magnificent hall. The painter loved to introduce rich architectural ornaments into his works, and to shew that knowledge of perspective which he had acquired from the greatest master of the science in that age, Pietro della Francesca. An open arcade is remarkable for the elegance of design which Pietro was at that time displaying in the decoration of the cathedral and principal buildings of his adopted city. On the pedestal supporting the martyr is inscribed the name of the painter, and on the pilasters of the arcade the date 1505. Pietro was then in the fifty-ninth year of his age. About ten years previously he had settled in Perugia, after his fame had been established by the execution of great works in Florence and in Rome. The city had conferred upon him the right of citizenship, and had even raised him to the dignity of one of the ten 'Priori,' or magistrates. During these ten years he had painted his finest pictures, amongst them the altar-piece for the Certosa of Pavia, now in the National Gallery. In Perugia and the neighbouring towns he decorated the principal buildings and churches. The celebrated frescoes in the 'Cambio,' or Exchange, and the adjoining chapel, were executed in 1500; the Adoration of the Magi at his native place, Citta della Pieve, in 1504. His powers were at their height when he painted the Martyrdom of S. Se-

bastian at Panicale. At this time the fame of his school had spread through Italy, and had brought to him his most distinguished scholars, L'Ingegno, Lo Spagna, Tiberio d'Assisi, and many others, whose paintings have been so frequently confounded with those of their master. They aided him in his great undertakings, and rendered them perfect and complete in their most minute details."

Swiss Watch Trade.

In the year 1679, a youth of La Sagne, near Locle, named Daniel John Richard Bressel, who was then about fifteen years of age, endeavoured to repair a watch, intrusted to him by a horse-dealer, as the only person in the whole valley who had any knowledge of mechanics. On perceiving the mechanism of the watch, which he had taken to pieces, he suddenly became enamoured of the art, and, abandoning himself to the inspiration of genius, invented by the end of a year so large a number of tools, that he was himself able to make a watch, which he actually accomplished in the space of six months. The seed thus sown in the mind of the youth was not destined to prove barren, for becoming acquainted with James Brandt of La Chaux-de-Fond, they both entered into partnership, Richard establishing himself in Locle, where he resided until his decease, in 1741.

For several years after this event, Richard's five sons at Locle, and Brandt at La Chaux-de-Fond, were the only persons carrying on the trade of watchmakers in these valleys. As early as 1780, however, the manufacture of watches was in a most flourishing condition, the population of Locle was estimated at 7,000 souls, while that of La Chaux-de-Fond amounted to nearly that number. All the other valleys of Neuchâtel, and St. Imier, in the ancient bishopric of Basle, together with a great many villages of Franche-Comté, in France, to a distance of thirty miles from La Chaux-de-Fond, had also arrived at a truly surprising prosperity.

This little community of artists, composed of natives, Frenchmen, Genevese, and Germans, has ever since distinguished itself by a variety of valuable discoveries and inventions. Instruments of the most delicate description, employed by the watchmakers of Paris and London, are manufactured in these valleys. All the inhabitants, men, women, and children, employ themselves in some one of the branches of art. The number of workmen, of every description, in gold and other metals, in wood, ivory, tortoiseshell, and glass, and that of painters, engravers, and of those who prepare the tools used by watchmakers, is very considerable.

The most celebrated artists of these valleys are the two Droz's, father and son, who are particularly renowned for their automata. Among their masterpieces was a clock, with the figures of a negro, a dog, and a shepherd, which Droz, the older, exhibited in Madrid. When this clock struck, the shepherd played six airs on his flute, and his dog came fawning towards him. The king of Spain was charmed at the sight. "The pretty tricks of my dog," said M. Droz, "are his least merits. If your majesty do but touch one of the apples in the basket near the shepherd, the little animal will also give proof of his fidelity." The king took an apple, and the dog flew at his hand, barking so violently, that his majesty's own dog also began barking. This curious piece of workmanship is still to be seen in the palace of the kings of Spain.

Scene Painting.

There are two descriptions of light to be paid attention to in scene-painting. One the light which the painter supposes to illuminate the objects of his performance; the other that which actually does light up the canvas; and in this respect the scene-painter possesses a great advantage over every other, in multiplying, combining, and contrasting to his taste, and the number and force of the hidden lights with which he radiates his work.

But, on the other hand, the scene-painter has to contend with difficulties peculiar to his confined walk of art. The necessity of giving a brilliant light to the audience part of the house is often destructive to the truth and delicacy of those tints which the artist applies to his scene; while, in addition, the perspective is frequently contradicted and violated by the actor moving about at the very back of the stage; when all those objects placed there, which, whilst the performer remained in front—where everything is in unison with his natural size—appeared in due proportion, lose their verisimilitude, and appear insignificant and disproportioned. The man becomes of the same height as the rock or tree, and the imagination of the spectator has insufficient power to preserve the illusion of the scene. The latter disadvantage which can scarcely be obviated, the artist would do well, nevertheless, to keep constantly in remembrance, and to modify as much as possible—and the actor, also, if he be desirous of rendering the representation a perfect one, will remain as little as possible at the back of the scene.

As the scene-painter is often required to decorate the places represented with statues, &c., it is necessary that he should be capable of drawing well the human figure; he should also possess a knowledge of, and a taste for, the *chefs-d'œuvre* of ancient art; and should be especially careful not to violate consistency by placing, for instance, in a Greek temple, affected or mutilated statues. In addition to these qualifications, architectural and landscape painting should enter into his course of study, as their use, and, indeed, necessity, must be self-evident.

To the scene-painter, the use of brilliant colours, of skilful *chiaro-scuro*, of striking management of masses of light and shade is obvious. He addresses less the heart and understanding than the eye. With him *effect* is everything. His fame, as well as his works, is commonly of short duration; and there is, consequently, the greater reason that he should acquire that promptness and decision of style which would secure immediate approbation.

For a performance of this description to be eminently successful, it is requisite that it should be not only well painted and striking in effect, but that it should be also *appropriate*—in good *costume*; it should conform, in style and in taste, to the manners and usages of the people amongst whom the scene is placed.

CORRESPONDENCE.—Received: "A Decorator" (Brixton); "J. J. M." (Bath). "Cosmo" (Dumfries) is informed that we intend giving an Architectural Glossary immediately.

NOTICE.—Vol. I. of the UNIVERSAL DECORATOR will be ready in a few days, in handsomely gilt and embossed covers, and with gilt edges, price 7s. 6d.—The title page and Index to Vol. I. is now publishing, price Twopence. Odd numbers, to complete sets, may be had, by order, of any Bookseller.

Oriental Gems.

Under this head are comprised the different varieties of *corundum*. Jewellers distinguish them as follows:—when blue, as sapphire; red, ruby; yellow, topaz; green, emerald; violet or purple, amethyst. Mr. Hertz observes, that the term *oriental* is applied to the above varieties of corundum as an epithet distinguishing them from other and very different stones, to which the names of ruby, emerald, amethyst, and topaz are properly applied. They rank next in hardness to the diamond; in chymical composition are found to consist of from 90 to 92 per cent. of alumina, with a small quantity of silica, lime, and oxide of iron; different proportions of the latter is the cause of their variation of colour. The crystalline form is usually a six-sided prism, variously terminated.

Some crystals, when cut *en cabochon*, present a silvery star of six rays, in a direction perpendicular to the axis; this variety is termed *asteria*, or star-stone. The same crystal occasionally exhibits an union of two or three colours. Two very fine specimens of these gems, a sapphire and a ruby, are among the jewels on her Majesty's crown. The Marquis of Northampton possesses a fine sapphire, cut into the form of an Indian deity. On the shrine of the "Three Kings," in the Cathedral at Cologne, are numerous star-stone sapphires, which appear to be the most valuable part of that singular collection of gems.

The ruby, when above a certain dimension, and of perfect colour, is of more value than a diamond of the same size.

The *chrysoberyl*, or *cymophane among jewellers*, ranks next in hardness to the substances already described, and occurs in semi-transparent crystals, of yellowish-green colour, which are frequently macled.

Spinelle Ruby is found crystallised in the form of the regular octohedron, the rhombic dodecahedron, and frequently in macles presenting different forms. In colour it is found of all shades of red, scarlet, and crimson.

Topaz is found crystallised in a rhombic prism, which is generally striated in a longitudinal direction, also in rolled masses in the beds of rivers. Colour varies; white, yellow, and light blue; it breaks readily at right angles to the axis of the prism, presenting a smooth brilliant surface. Its principal localities are Siberia, Saxony, Brazils, New South Wales. Large crystals have also been found in Aberdeenshire. Small crystals have likewise been found accompanying crystals of mica, quartz, felspar, beryl, and albite in the Mourne mountains, Ireland.

Emerald.—This beautiful stone is found in six-sided prisms; colour varying from a bright green to pale blue, and yellow. It is readily fractured at right angles to the axis of the prism. The analysis yielded silica 68, alumina 15, glucina 12, with traces of oxide of iron, tantalum, and chrome.

Aquamarine and *Beryl.*—The former of these is of a light blue colour; the latter, of various shades of green, and sometimes yellow. It is found in six-sided crystals, generally striated in the longitudinal direction. Mineralogists class these as a variety of the emerald. The planes of the latter are generally smooth. Silica 66, alumina 16, glucina, 15, with traces of oxide of iron.

Hyacinth, *Zircon*, or *Jargoon.*—The usual form of the crystals of these substances is that of a four-sided prism, terminated by a four-sided pyramid: they are varieties of one and the same substance. The colour varying from grey, brown, yellow, and red. The opaque varieties are not used in jewellery.

The hyacinth is found to consist of 70 parts of zirconia, 25 silica, and a trace of oxide of iron. Its specific gravity is rather high, being 4·6. Hardness, below that of the topaz. These substances are found in Siberia, embedded in felspar and mica; also in Norway, embedded in sienite, in the beds of rivers from Ceylon and Auvergne.

Chrysolite or *Peridot.*—This substance is found of a yellow, brown, and various shades of green; its specific gravity about 3·4; hardness, about that of quartz; contains magnesia 43, silica 39, oxide of iron 19. It is principally found in volcanic districts.

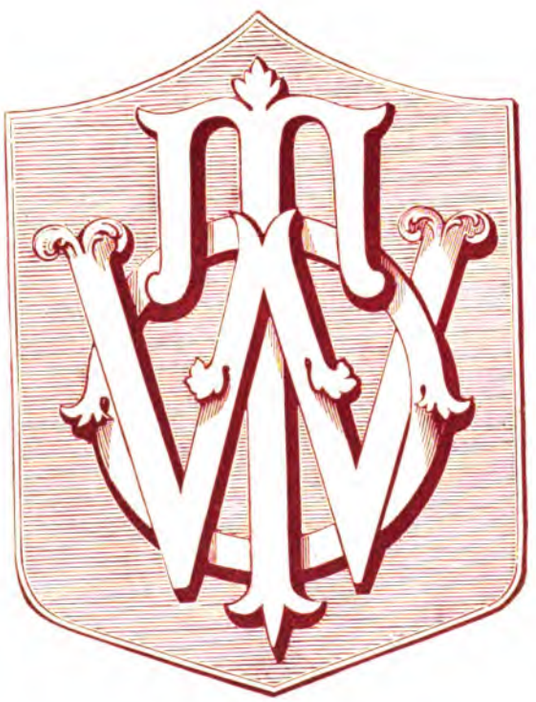
Noble or *Precious Opal.*—This beautiful mineral is never found crystallised; its beauty may be said to consist of its imperfections. It exhibits all the prismatic colours; hardness, rather below quartz; specific gravity, 2. By analysis it is found to contain 90 per cent. of silica and 10 of water. The best specimens are found in decomposed porphyry from Czervenitza in Hungary; it is also brought from Honduras in America.

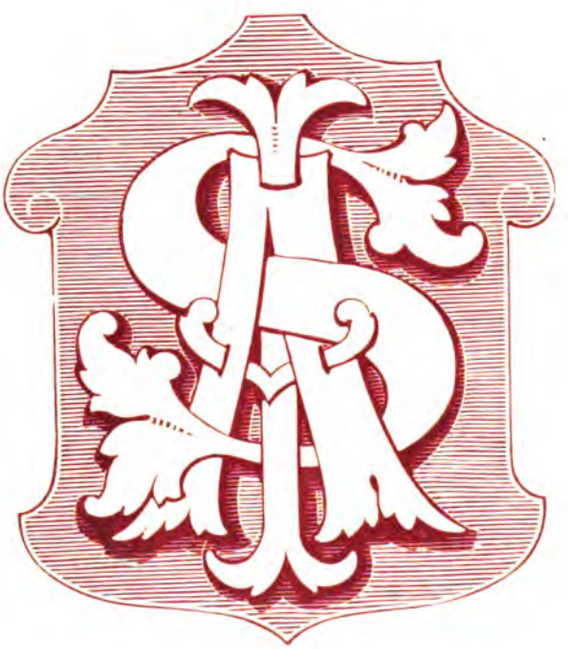
Precious Garnet or *Almandine.* — The prevailing colour of this mineral is various shades of red; it is found crystallised in the rhombic dodecahedron; its specific gravity, 4; hardness about the same as quartz; it consists of silica, alumina, and oxide of iron. Its principal localities are Syria, Ceylon, and Bohemia.

Technicologia.

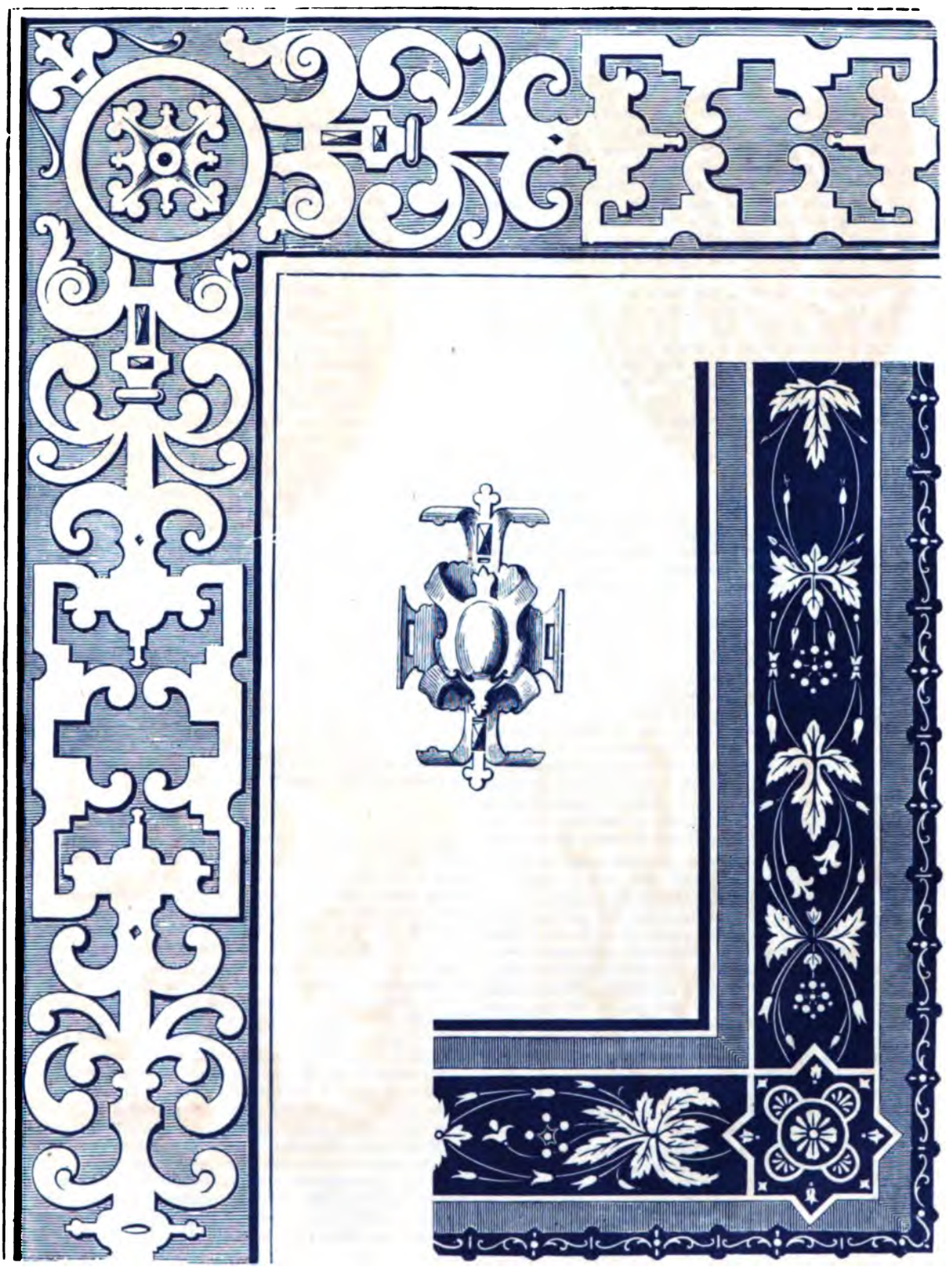
107. *Varnishes.*—Lac varnishes or lacquers consist of different resins in a state of solution, of which the most common are mastic, sandarac, lac, benzoin, copal, amber, and asphaltum. The menstrua are either expressed or essential oils, as also alcohol. For a lac varnish of the first kind, the common painters' varnish is to be united by gently boiling it with some more mastic or colophony, and then diluted again with a little more oil of turpentine. The latter addition promotes both the glossy appearance and drying of the varnish. Of this sort is the amber-varnish, which, however, has always a dark brown colour, because the amber is half-burned; but if it be required of a bright colour, amber-powder must be dissolved in transparent painters' varnish, in Papin's machine, by a gentle fire. As an instance of the second sort of lac-varnishes with ethereal oils alone, may be adduced the varnish made with oil of turpentine. For making this, mastic alone is dissolved in oil of turpentine by a very gentle digesting heat, in close glass vessels. This is the varnish used for the modern transparencies employed as window blinds, fire-screens, and for other purposes. These are commonly prints coloured on both sides, and afterwards coated with this varnish on those parts that are intended to be transparent. Sometimes fine thin calico, or Irish linen, is used for this purpose; but it requires to be primed with a solution of isinglass before the colour is laid on. Copal may be dissolved in genuine Chio turpentine, according to Mr. Sheldrake, by adding it in powder to the turpentine

previously melted, and stirring till the whole is fused. Oil of turpentine may then be added to dilute it sufficiently; or the copal in powder may be put into a long-necked matrass with twelve parts of oil of turpentine, and digested several days on a sand-heat, frequently shaking it; this may be diluted with one-fourth or one-fifth of alcohol. Metallic vessels or instruments covered with two or three coats of this and dried in an oven each time, may be washed with boiling water, or even exposed to a still greater heat, without injury to the varnish. A varnish of the consistence of thin turpentine is obtained for aërostatic machines, by the digestion of one part of elastic gum or caoutchouc cut into small pieces, in thirty-two parts of rectified oil of turpentine. Previously to its being used, however, it must be passed through a linen cloth in order that the undissolved parts may be left behind. The third sort of lac-varnishes consists in the spirit-varnish. The most solid resins yield the most durable varnishes; but a varnish must never be expected to be harder than the resin naturally is of which it is made. Hence, it is the height of absurdity to suppose that there are any incombustible varnishes, since there is no such thing as an incombustible resin; but the most solid resins by themselves produce brittle varnishes, therefore something of a softer substance must always be mixed with them, whereby this brittleness is diminished; for this purpose gum elemi, turpentine, or balsam of capaiva are employed in proper proportions. For the solution of these bodies the strongest alcohol ought to be used, which may very properly indeed be distilled over alkali, but must not have stood upon alkali. The utmost simplicity in composition with respect to the number of the ingredients in a formula is the result of the greatest skill in the art; hence it is no wonder that the greatest part of the formulas and recipes that we meet with are composed without any principle at all. In conformity to these rules, a fine colourless varnish may be obtained by dissolving eight ounces of gum sandarac and two ounces of Venice turpentine in thirty-two ounces of alcohol by a gentle heat. Five ounces of shell-lac and one of turpentine, dissolved in thirty-two ounces of alcohol by a very gentle heat, give a harder varnish but of a reddish cast. To these the solution of copal is undoubtedly preferable in many respects. This is effected by triturating an ounce of powder of gum copal, which has been well dried by a gentle heat, with a drachm of camphor, and, while these are mixing together, adding by degrees four ounces of the strongest alcohol without any digestion. Between this and the gold varnish there is only this difference—that some substances that communicate a yellow tinge are to be added to the latter. The most ancient description of two sorts of it, one of which was prepared with oil and the other with alcohol, is to be found in Alexius Pedemontanus De i Secreti, Lucca, of which the first edition was published in the year 1557; but it is better prepared and more durable when made after the following prescription:—Take two ounces of shell-lac, of arnatto and turmeric of each one ounce, and thirty grains of fine dragon's-blood, and make an extract with twenty ounces of alcohol in a gentle heat. Oil varnishes are commonly mixed immediately with the colours, but lac or lacquer varnishes are laid on by themselves upon a burnished coloured ground; when they are intended to be laid upon naked wood, a ground should be first given them of strong size, either alone or with some earthy colour mixed up with it by levigation. The gold lacquer is simply rubbed over brass, tin, or silver, to give them a gold colour. Père d'Incarville has informed us that the tree which affords the varnish of China is called Tsi-chou by the Chinese. This tree is propagated by offsets. When the cultivator is desirous of planting it, he takes a branch which he wraps up in a mass of earth by means of flax. Care is taken to moisten this earth; the branch pushes out roots, and is then pruned and transplanted. This tree grows to the size of a man's leg. The varnish is drawn in spring. If it be a cultivated tree, it affords three gatherings. It is extracted by incisions made in the spring; and when the varnish, which is received in shells, does not flow, several hogs' bristles moistened with water or saliva are introduced into the wound and cause it to run. When the tree is exhausted, the upper part of it is wrapped in straw, which is set on fire, and causes the varnish to precipitate to the bottom of the tree, where it flows out of perforations made for that purpose. Those who collect the varnish set out before day-break, and place their shells beneath the apertures. The shells are not left longer than three hours in their place, because the heat of the sun would evaporate the varnish. The varnish emits a smell, which the workmen are very careful to avoid inspiring. It produces an effect which they call the bud of the varnish. When the varnish issues from the tree, it resembles pitch. By exposure to the air it gradually becomes coloured, and is at last of a beautiful black. The juice which flows from incisions made in the trunk and branches of the rhus vernix possesses the same properties; it is a white milky fluid, which becomes black and thick by the contact of the air. To make the varnish bright, it is evaporated by the sun; and a body is given to it with hog's gall and sulphate of iron. The Chinese use the oil of tea, which they render drier by boiling it with orpiment, realgar, and arsenic. A coat of varnish ought to possess the following properties:—1. It must exclude the action of the air. 2. It must resist water; for otherwise the effect of the varnish could not be permanent. 3. It ought not to alter such colours as are intended to be preserved by this means. Resins are the only bodies that possess these properties, and consequently must be used as the bases of varnish. The question which of course presents itself, must be then, how to dispose them for this use; and for this purpose they must be dissolved, as minutely divided as possible, and combined in such a manner, that the imperfections of those which might be disposed to scale, may be corrected by others. Before a resin is dissolved in a fixed oil, it is necessary to render the oil drying. For this purpose the oil is boiled with metallic oxides, in which operation the mucilage of the oil combines with the metal, while the oil itself unites with the oxygen of the oxide. To accelerate the drying of this varnish, it is necessary to add oil of turpentine. The essential varnishes consist of a solution of resin in oil of turpentine. The varnish being applied, the essential oil lies off, and leaves the resin. This is used only for paintings. When resins are dissolved in alcohol, the varnish dries very speedily, and is subject to crack; but this fault is corrected by adding a small quantity of turpentine to the mixture, which renders it brighter and less brittle when dry. The coloured resins or gums, such as gamboge, dragon's-blood, &c., are used to colour varnishes. To give lustre to the varnish after it is laid on, it is rubbed with pounded pumice-stone and water, which being dried with a cloth, the work is afterwards rubbed with an oiled rag and tripoli. The surface is last of all cleaned with soft linen cloths, cleared of all greasiness with powder of starch, and rubbed bright with the palm of the hand.





CIPHERS AND MONOGRAMS.



CORNERS AND CENTRE PIECE.

Drawing.

THE following extracts from two good works — one the "Aphorisms on Drawing," by the Rev. S. C. Malan, M.A., the other, the "Amateur's Drawing Manual," by an American writer, J. G. Chapman, N.A.—will, we believe, be read with interest by the large class of students who depend mainly on their own resources for artistic cultivation.

Firstly, of style, Mr. Malan observes—

"Form your own style upon Nature. Learn the principles of art of whom you may best, and follow good advice as to your work; but educate your taste, train your eye, and form your hand on Nature. It is the only perfect master. For even the best of teachers cannot be followed implicitly, since they shew, side by side with flashes of genius, proofs of oversight or of inferiority in some things. Raffaële, for instance, ought never to have attempted landscape in any way; his backgrounds often kill his perfect figures. Thus, on the cartoon of 'The Miraculous Draught of Fishes,' not only is the perspective of the water incorrect (judging, at least, from the copies I have seen), but both Our Saviour and St. Peter are put together in a boat too small to carry one man in safety, much less two. In the celebrated fresco of 'The Lord's Supper,' by Leonardo da Vinci, the table, as it is drawn, cannot possibly stand, for the trusses on which it rests have only one side. Our Saviour's head, also, is drawn in the centre of a square window, the opening of which takes from the effect of the light and shade on that Divine head. The whole picture would have been better if the table had been laid in the length and not in the breadth of the room. In like manner, that great master, Salvator Rosa, often painted trees and rocks of his own, with a masterly touch, it is true, but still not always after the model of Nature."

And again—

"There, are, however, certain things which may either assist or hinder in the acquisition of a bold and true style of drawing. For instance, the use of a hard and fine pencil, and of a small copy, with white paper highly hot-pressed, will effectually cramp the hand. But a soft pencil, BB, BBB, or BBBB, smooth and soft lightly-tinted paper, with large copies at home and Nature abroad will, on the contrary, give a bold and free style; at least they will materially contribute towards it. Likewise, in water colours, if you paint with a small brush, much colour and a little water, on smooth paper, the effect of your drawing, when done, will be harsh, heavy, woolly, and without any of that transparency which constitutes the chief beauty of water colours. If, on the other hand, you accustom yourself to work with a very large brush (provided it has a good point), abundance of water, comparatively little colour, and on rough paper, your outlines may be harsh at first, but that will correct itself in time; and they will be well defined and characteristic, your work will possess an airy transparency, and you will acquire a freedom of touch that nothing else can give. Much also depends on the way in which you hold the pencil or the brush. If you hold either as you do a pen in writing, that is, resting against the tip of the middle finger, you never will draw; or, at least, your touch will always remain stiff and graceless. The pencil or the brush should always be held lightly; it should rest on the flat side of the middle finger, above the root of the nail, and almost upon the first joint. The whole length of the tip-joint of the fore-finger then falls naturally upon the pencil, and holds it slightly; and the thumb, a little curbed, gently presses the pencil, opposite the first bend of the forefinger. The pencil or the brush held in that manner may be turned and handled in any way you please; and with the little finger alone resting on the paper, and acting like a spring, the hand is so disposed as of necessity to give you a free and easy touch.

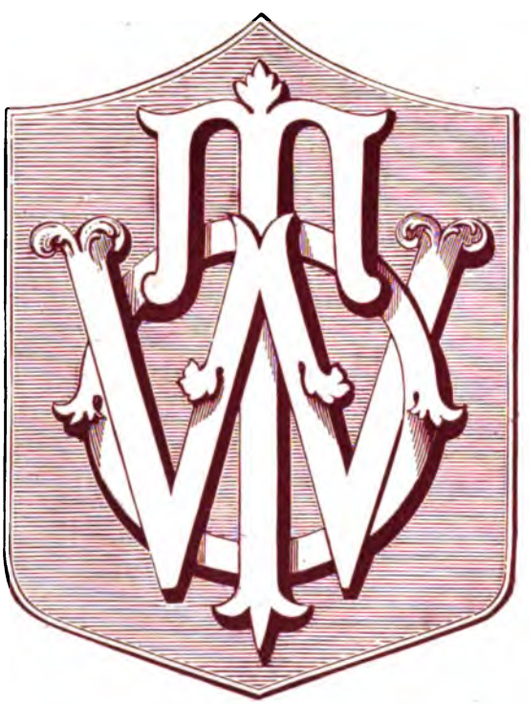
"We must bear in mind that, after all, a rapid style of drawing is only, as it were, running in the art. If a child attempts to run ere he can walk, a fall must follow; but after he has learnt to walk step by step, and has strengthened his gait by careful exercise and attention to it, he may then run both swiftly and with grace. It is, therefore, a mistake to try and acquire at once a bold and rapid style; it can only come by study and by practice, since it is the result of being familiar with details. These need not always be told in drawing, but there can be no good drawing without a thorough knowledge of them."

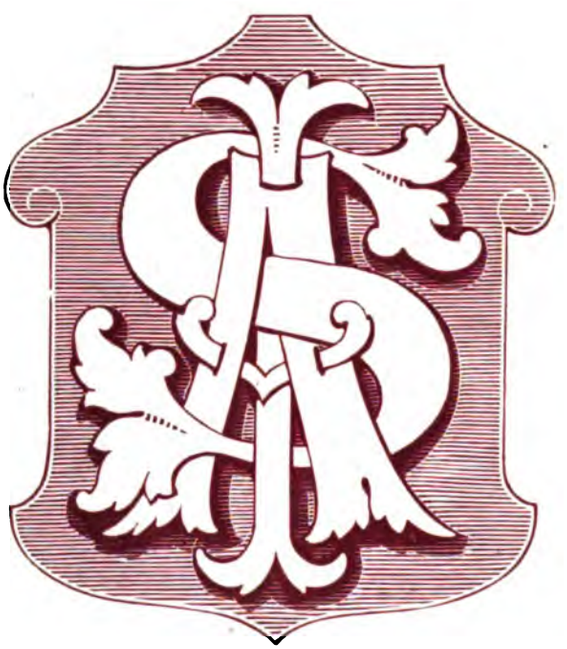
Mr. Chapman holds that—

"It is not only as a beautiful accomplishment, or a source of amusement for leisure moments, that the art of drawing should be cultivated. It has its practical uses in every occupation of life. It opens to all inexhaustible sources of utility as well as pleasure; practises the eye to observe and the hand to record the ever-varying beauty with which Nature abounds, and spreads a charm around every object of God's beautiful creation, unfelt and unknown to those who have failed or neglected its cultivation. It does more: it gives strength to the arm of the mechanic, and taste and skill to the producer, not only of the embellishments, but actual necessities of life. From the anvil of the smith and the work-bench of the joiner, to the manufacturer of the most costly productions of ornamental art, it is ever at hand with its powerful aid, in strengthening invention and execution, and qualifying the mind and hand to design and produce whatever the wants or the tastes of society may require."

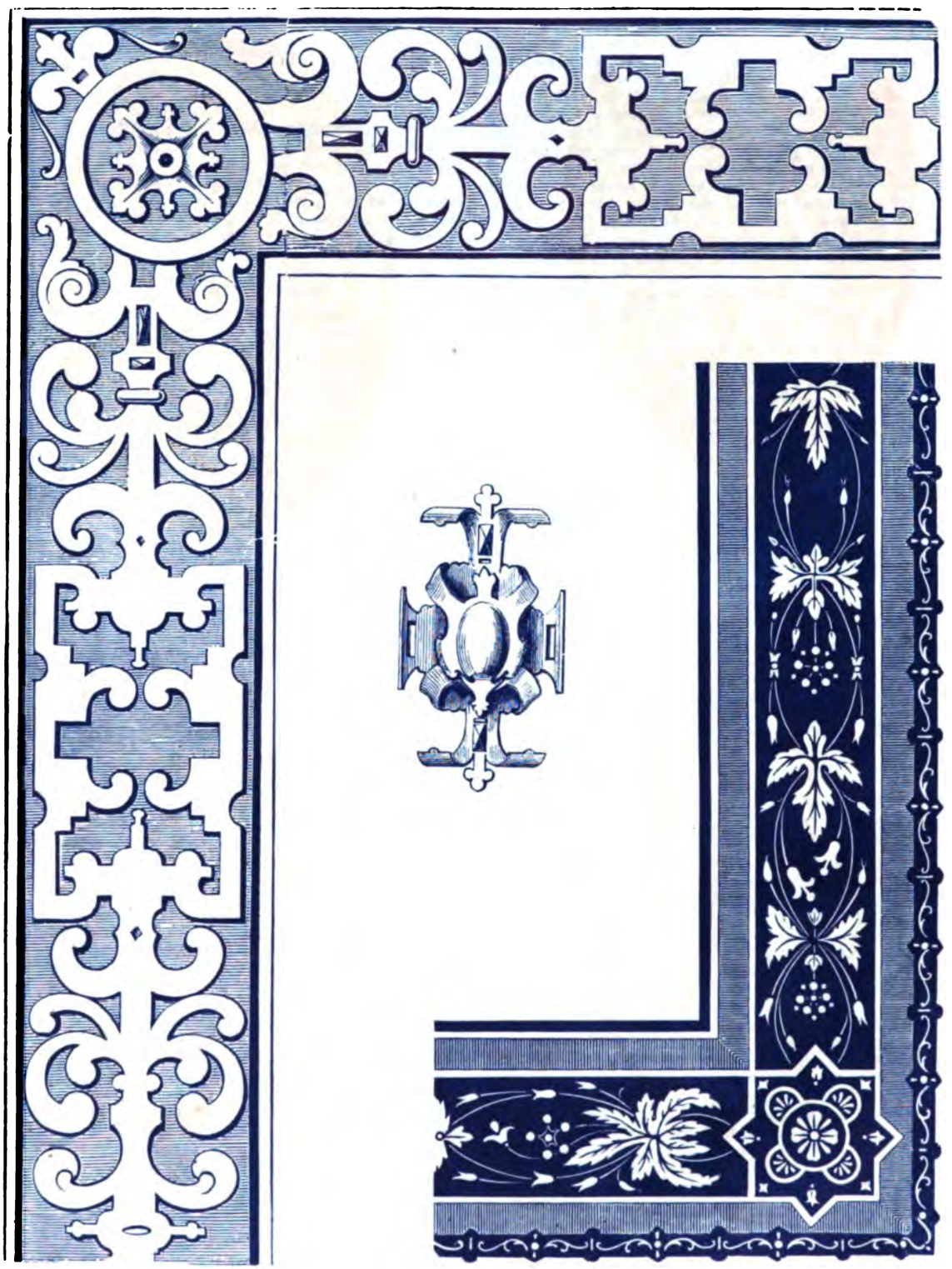
And on figure drawing, he says—

"There are few, even among most indifferent observers, who cannot detect imperfection in a limb or figure in nature, and as few comparatively who know that a man's skull is not all in one piece, and that his great-toe has one bone less than the others. If, therefore, those who make it no special business to observe or investigate so readily reach conclusions, why may not the artist venture upon the delineation of the human or any other living form, without the profound knowledge of the surgeon or naturalist? A smattering of anatomical knowledge prematurely acquired may even lead to injurious tendencies, as we have often had occasion to remark by the vain attempts of young aspirants to *build a figure* instead of *drawing it*. The reproof of Fuseli to a youth whom he detected in trying to make out the beautiful and delicate markings on the side of the Apollo by counting the ribs, is worth remembering: 'You need not count them, young man; they don't cost anything.'"





CIPHERS AND MONOGRAMS.



CORNERS AND CENTRE PIECE.

and confused strokes. The following receipt has been employed with success:—Pure white wax (of the first quality), four parts; soap, dried, made of tallow and soda, two parts; white tallow,* two parts; gum-lac, two parts; lamp-black,† one part; oil copal varnish, one part. First melt the wax over a slow fire, and then add by degrees, and a little at a time, the gum-lac, broken into small fragments, incessantly stirring all the while with a spatula; then mix in the soap, previously reduced into fine shavings, and when the mixture is perfect pour in the oil varnish, with which the black has been previously ground up. Continue to heat and stir it continually, until the paste has acquired a convenient consistence, and which may be ascertained by forming a crayon in a mould with it and letting it become cold. Then try it with a penknife and see whether the parings are brittle. When the paste is sufficiently heated, form it into crayons by pouring it into proper moulds.

Golden Glass.

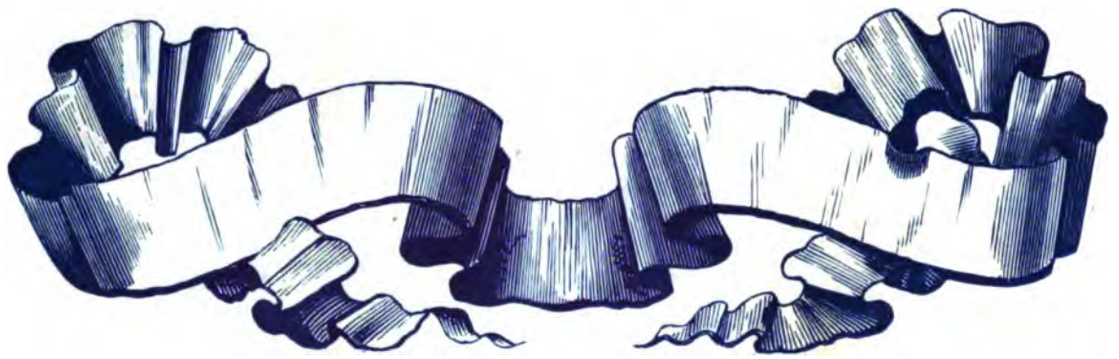
Not long after the time when the art of making the copper-red glass was lost, Kunkel appears to have discovered that gold melted with flint glass was capable of imparting to it a beautiful ruby colour. As he derived much profit from the invention, he kept this method a secret, and his successors have done the same to the present day. The art, however, has been practised ever since for the purpose of imitating precious stones, &c., and the glass used to be sold at Birmingham, for a high price, under the name of Jews' glass. The rose-coloured scent-bottles, &c., now commonly made, are composed of plain glass, "flashed" or coated with a very thin layer of the glass in question. Numerous experiments have been made on this subject, and have been successful in producing glass of a fine crimson colour. One cause why so many persons have failed in the same attempt is suspected to be in the fact that they have used too large a proportion of gold; for it is certain that an additional quantity of gold beyond a known point, so far from deepening the colour, actually destroys it altogether. Another cause probably is that they have not employed a sufficient degree of heat in the fusion. It has been found that a degree of heat, judged sufficient to melt cast iron, is not strong enough to injure the colour. It would appear that, in order to receive the colour, it is necessary that the glass should either contain a proportion of lead, or some other metallic flux. Bismuth, zinc, and antimony have been found to answer the purpose; but it has been attempted in vain to impart any tinge of this colour to crown-glass alone. Glass containing gold exhibits the same singular change of colour on being exposed to a gentle heat. The former when taken from the crucible is generally of a pale rose-colour, but sometimes colourless as water, and does not assume its ruby colour till it has been exposed to a low red heat, either under a muffle or in the lamp. Great care must be taken in this operation, for a slight excess of fire destroys the colour, leaving the glass of a dingy brown, with a blue transparency, like that of gold leaf. These changes of colour have been vaguely attributed to change of oxygenation in the gold, but it is obviously impossible that mere exposure to a gentle heat can effect any chymical change in the interior of a solid mass of glass, which has already undergone a heat far more intense. In fact it is found that metallic gold gives the red colour as well as the oxide, and it appears scarcely to admit of a doubt, that in a metal so easily reduced, the whole of the oxygen must be expelled long before the glass has reached the melting point. It has long been known that silver yields its colour to glass while in the metallic state; and everything leads one to suppose the case is the same as to gold. There is still one other substance by means of which it is possible to give a red colour to glass, and that is a compound of tin, chromic acid and lime, but the trials do not lead us to suppose that glass thus coloured will ever be brought into use.

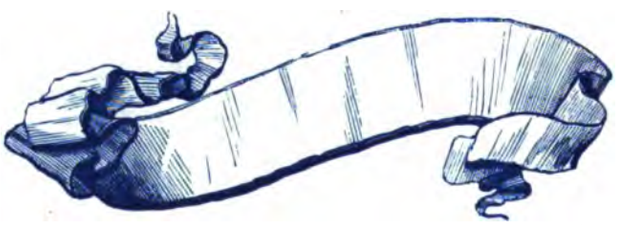
* In winter double this quantity should be used, in order to diminish the hardness of the crayon, caused by the lowering of the temperature.

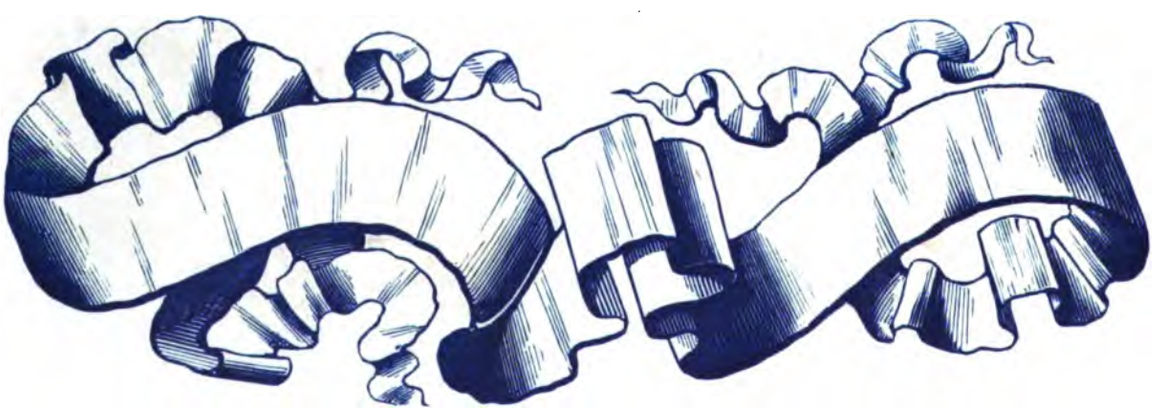
† The black produced from smoke must not be used, but instead thereof, substitute that produced from charred rags, which is much finer, and is known by the name of German black.—*Lomet.*

THEORY AND PRACTICE.

There is a class of study essentially important to the young architect, and that is practice. He may have acquired all the principles which govern science. He may have studied monuments, learnt the rules of proportion, and made himself thoroughly acquainted with the whole sphere of art. But, unless he be also versed in the practical details, it would be dangerous to himself and fatal to his employer, if he undertook a building of any importance. He has a conscientious duty to peform: not only to design well, but to execute the work in the soundest manner and with the least cost. Young men, carried away by the enthusiasm to which the fascinating attraction of the art of drawing gives rise, find it irksome to enter into the details of construction, the cost of materials, measuring and valuation. But if an architect wishes to possess all the means, by which he may realise his conceptions, he must go through this ordeal, he must visit and study works in progress: and when he becomes better acquainted with the subject, he will find a growing interest in the pursuit. There is no moment of his life, at which the true architect ceases to study and acquire knowledge: and no source is too despicable for him to gain information. The labouring artisan has many mechanical contrivances by which he may accomplish his task and execute his work. From him the architect, whether as a student or as the more advanced practitioner, may learn much. In fact we must not only be satisfied that a thing is done, but know how it is done; and eagerly avail ourselves of the knowledge of the workman. By not being ashamed of asking questions at any period of our career, we gain their respect and win their confidence. How many a young man is there, who leaves an office without any acquaintance with these departments of the profession! He commences business thus inadequately prepared. His very first commission involves him in inextricable difficulties. He is at the mercy of the builder, the workmen, and all employed. A sense of his ignorance in this respect preys on his mind. He resolves to devote his energies to make himself thoroughly versed in the practical details of construction, and he passes years and years devoted to this; and thus employs time, which, had he been better trained, could have been more beneficially and honourably appropriated. He has still to learn his profession.—*Professor Donaldson's "Architectural Maxims."*







RIBBONS.

INITIALS

Polychromic Decoration of the Middle Ages.

MENTION has been often made in these pages of the art of polychromy, or practice of painting in positive colours, either on flat surfaces or sculptured forms. Certain existing coincidences in the application of colour have led to the inference that tints, when applied to sacred subjects, acquired a peculiar expression; hence the theory of symbolism of colours. Of the few facts on which this system is based there can be no dispute; but it is very questionable whether any such principles were kept in view in later ages, and under the more perfect forms of the decorative art, and highly improbable that the same symbols could, otherwise than by the most casual accident, be expressive of similar ideas at different times, and under religious systems capable of being referred to no common origin.

The object of polychromy is to heighten the effect of architectural decorations, either by causing a more just subordination of the various parts than can be obtained by mere chiaroscuro, or in supplying deficiencies that could not be so well filled up by any other means.

When the details of enrichment are minute, or greatly removed from the eye, the use of strongly contrasting colours is necessary to mark the various details and subdivisions which would otherwise be lost, or to connect more elaborate with plainer portions of the same work. It is often also used to attract the eye to the more important portions of a building; and the beautiful effect of the brilliant lines, gilded prominencies, and rich surfaces, harmoniously toned with diaper, is known to every admirer of mediæval architecture.

It is probable that in the practice of classic antiquity the ornamented colouring on walls and ceilings, and perhaps, in general, even the detail of arabesques, was left to the skill and fancy of the workmen. The style of execution in such instances as remain to us, exhibits great facility of production, accompanied by characteristics that distinguished them in a marked manner from the work of an artist. Yet, in most cases, there exists a certain concordance of parts and unity of effect that uneducated taste would be unable to attain. Perhaps we should be correct in viewing the various specimens as diversified reproductions of a few types in fashion at the time, with which the workmen would necessarily be familiar, and capable of applying without further assistance than the general direction of the superior artist, by whom the higher class of subjects were executed.

The same observations may be understood in a limited sense, of Gothic polychromy. The scientific architects of the middle ages appear to have employed not only the hand, but the genius of the craftsmen, in the diversified modes of ornament that so peculiarly distinguish Gothic architecture. In the structure, furniture, and enrichments of a great church, we see the aggregate of varying taste and genius. Its decorative paintings, its heraldries, its stained glass, its metal work, and even the different carvings, exhibit, each in its own department, and in some cases in almost every article, the impress of a distinct mind, yet all bent to one harmonious result by the influence of their subject, and the fashion of the time.

At the revival of the arts, decorative painting, both pictorial, and as consisting in the application of positive colour to objects whose projections and outlines were previously defined by the carver, was found universally subsisting throughout Europe. It does not appear, however, that polychromy and figure painting were anywhere cultivated as distinct branches of the art. While polychromic decorations required for their execution an artisan of superior skill, the general treatment of pictorial representations, the colours employed, the mode of their application, and the very intimate relation found to exist in works of both branches, induce us to believe them to be the work of craftsmen of the same class, and, when found in juxtaposition, of the same hand. Every degree of merit is found in the works of the middle ages, from the bad copyist of an imperfect school, to the most refined taste in decoration, and intense feeling and truthfulness, if not easy treatment, to pictorial representations.

Technicologia.

10. *Dial-plates.*— The dial-plates of clocks and watches are made in a variety of ways. In general they are composed of enamel upon a single plate of copper, unless they are more than a foot in diameter; larger ones are made in separate pieces, which are afterwards joined together; or they are made of glass, placed upon a white ground. Some dial-plates are made of silver, gold, and silvered or gilt brass. The enamelled dial-plates are formed of a thin plate of copper, enamelled upon both sides, and having hours, minutes, seconds, &c., painted upon the ground. To make one of these dial-plates, a thin plate of copper of the requisite size is taken, and hammered upon a slightly concave anvil of hard wood, with a convex-headed hammer, which speedily reduces it to the proper convexity; a hole is then made in the middle, which is enlarged with a tool put into it from the concave side, to retain the enamel when in a melted state. The copper plate is then placed upon the platine of the works, fitted to it by passing a tool through the centre holes of each, and being kept in its place by a vice, the holes for the screws, by which the dial-plate is to be fastened to the rest of the works, and that by which the key is to be introduced, are made; which last is to have a ridge round it, for the same purpose as that round the central hole. Copper wires are then forced into the holes by which it is to be attached to the works, and cut to the proper length, after which they are soldered. The plate is cut of such a size, that the edge may be hammered up to form a similar ridge round the whole face. The copper plate being thus manufactured, it is cleansed, by being left a short time in water sharpened with a little sulphuric acid, until the surface is perfectly clean; it is then dipped in common water, and brushed with a brush of brass wires. The enamel used ought to be very white; it is imported and sold by the ironmongers in flat cakes.

The cakes are broken in a hardened steel mortar, and reduced, for the most part, into small pieces, about the size of small grains of sand, as nearly equal as possible. These are first washed in very clear water, and the milky liquor poured off, and left to settle, by which the finer powder is separated. The grains of enamel are then washed again several times with a clear water, and the settlings of the water that is poured off kept as before, for enamelling the under surfaces of the plate. The grains of enamel being thus well washed, they are put into a glass vessel, and sulphuric acid is poured on them, so as to float them about a quarter of an inch. The whole is stirred with a glass rod or spatula, and the acid left on the enamel for twelve hours, in order to dissolve away the metallic particles it has rubbed off the steel mortar, and which would foul the whiteness of the enamel when applied on the face of the plate. The nitric acid is then poured off, and the enamel washed again with water, until all the acid is got rid of; after which it is again covered with clean water, and kept under it to preserve its cleanness and whiteness. Not only the convex face of the dial-plate, or that on which the hours and minutes are to be painted, is enamelled, but also the concave face. This counter-enamelling, as it is called, is necessary, lest, when the enamel of the upper face is melted, the action of it on a plate, while hot, should change its curvature; upon which account both faces are enamelled at one and the same time. The enamel is first put on the concave or under face, which is done, as has been just said, with the fine settlings obtained in washing the granular enamel. For this purpose, a tool is put into the centre hole, and the water being poured off the settlings, it is taken up with a steel spatula, and spread as equally and as thinly as possible over the concave surface; the tool is then taken out, and there is put in its place a bit of clean linen, which draws and absorbs the water; if this precaution were not taken, the counter-enamelling would fall off when the dial-plate was turned over. To enamel the convex face the plate is turned over, a tool put in the centre hole, and there is spread over the whole surface a layer of the bruised enamel, as evenly as possible, taking care to well cover the edges of the dial-plate, and those of the various holes, to prevent the heat from burning them. To draw off the water which adheres to the enamel, a piece of fine linen is put round the edge of the plate, which draws out nearly all the moisture; and, in order that the particles of the enamel may arrange themselves properly, and be packed as close as possible, a few slight strokes are given to the tool in the centre hole. The neatness with which this is executed is essential, for to this is owing the beauty, polish, and glassy surface of the dial-plate, by reason that the enamel becoming well packed, there are, when it melts, no hollows below the surface, and hence the surface remains perfectly smooth. In order to be sure that no water remains in the enamel, the dial-plates are dried upon a square sheet of iron, turned up on the edges on three sides, and placed over a chafing-dish, where it has its temperature raised. The preparation of the dial-plate being finished, it is introduced by degrees under a muffle placed in a furnace, in order that it may be heated gradually. The furnace used in London for this purpose has some peculiarities in its construction; but any muffle furnace, so long as it is well made, will suffice for the purpose. It is left in this state until the enamel is perceived to begin to melt, when the sheet of iron on which the plate is placed, is turned round very gently, in order that the heat may affect every part of the dial-plate equally. When the polish of the surface shews that the enamel is melted, the plate is slowly withdrawn from the furnace, and left for some time at the mouth of the muffle, in order that the enamel may cool very slowly, as otherwise it would crack and split off the plate of copper. After the first firing, the plate is again cleaned, as before, with water sharpened with sulphuric acid; and the under surface is examined, and, if necessary, retouched with the settlings, as before. A fine layer of enamel is also spread over the convex face, and the plate is again exposed to the fire, with the same precautions as before; a third layer of the finest and whitest enamel is again spread on the upper or convex surface, and fired in the same manner, by which means the dial-plate receives all the beauty of which it is capable. The hours, minutes, seconds, &c., are then enamelled on a convex face with a black, soft enamel, made for this purpose. It is ground very fine, in an agate mortar, with a pestle of the same substance, along with oil of spike, and spirit of turpentine. It is considered necessary that the enamel should be reduced to an impalpable powder, and therefore half a day is usually employed in grinding a single troy drachm. More oil of spike is then added, to render it sufficiently thin to flow from the pencil. The place where the hour of twelve is to be placed having been marked from the first by a slight touch of the file, the dial-plate is then placed on a flat surface, and, by means of a pair of compasses, with one point blunt, and placed truly on the centre, and with the other bearing a blacklead pencil, the lines between which the hours and minutes are to be placed are slightly traced on the surface. In order to divide these circles, a protractor with a moveable limb is used, and the place of the hours, minutes, seconds, &c., traced with blacklead; these are then painted, and when thoroughly dry, the dial-plate is again fired in the same manner as before, and is then finished. The dial-plates of clocks, when they do not exceed twelve or fifteen inches in diameter, are enamelled in the same way; but larger dial-plates are made in separate pieces, generally as many as there are hours on the face, and then joined together.

NEW HEATING APPARATUS.

A patent has been recently obtained by Mr. Hayden for a new caldron, which will be very serviceable for out of door or shop-work, where only a temporary heat is required. The apparatus is exceedingly simple and portable; and its principal feature, that of rapid heating, is attained by a clever adaptation of the still-worm principle. Absolute safety from risk of fire is not its least recommendation; and as the fuel is not in contact with the vessel containing the liquid, the apparatus is admirably adapted for boiling oil, preparing varnish, &c.

CORRESPONDENCE.—X.Y.Z.—To profess a knowledge of every branch of art is more than we care about doing. The instructions we supplied were given to us by a "practical" man whom we know. We cannot claim a similar acquaintance with your friend. We will make search for further information, and publish it as soon as possible—if we succeed in obtaining it; but we are by no means convinced of your correctness.

NOTICE.

Vol. I. of the UNIVERSAL DECORATOR is now finished, and may be had in Numbers, Parts, or handsomely bound in embossed cloth, gilt sides and edges, price 7s. 6d. A Title, Preface, and Index, has been published at the price of an ordinary number.

VASE—ANTIQUE.

Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

By FRANCIS BENJAMIN THOMPSON.

CHAPTER V.—INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Oxygen (symbol O, equivalent 8·000, specific gravity 1·111).—This is a gas without colour or smell, yet most potent in its influences and most abundant in its quantity of all the elements. Its peculiar actions are constantly before our observation. It mingles with the atmosphere in the proportion of about 20 of its parts to 80 parts of nitrogen; combined with hydrogen, it forms water; while every substance in Nature is susceptible to its marvellous property of universal affinity. The well-known appearance of rust presented by the metals is due to this cause, the effect being termed oxidation. On weighing a piece of bright iron, then allowing it to become rusted, and again weighing the oxydised mass, it will be found to have increased in weight over 15 per cent. When oxygen combines in large quantities with other bodies, acidification takes place, and acids are formed. But although oxygen is capable of oxidating *every* substance, it only forms acids with a select number, as with sulphur and nitrogen, for instance, in the production of sulphuric and nitric acids. Furthermore, oxygen is the principal supporter of combustion, and the only sustainer of vitality.

Oxygen derives its name from a compound of the Greek οξυς, sour or acid and γενναω, I produce.

Oxygen, or rather the products of oxygen, the oxides,* are of considerable use in the arts. From them we derive our chief supply of pigments, either formed naturally or artificially, as zinc white, which is oxide of zinc.

Economic considerations have directed considerable attention to the cheap and expeditious methods of producing oxygen for oxydising purposes. The common method is to immerse the substance to be oxydised in an acid solution; but this process is slow and wasteful. Oxygen may be produced in small quantities for experiment, by mixing powdered black oxide of manganese with sulphuric acid in a flask, from which there is a connection by means of a pipe with the receiver of a pneumatic trough [described at p. 62, vol. i.]. Or the following formula may be employed to obtain the gas very pure:—"Place a small quantity of chlorate of potassa in a glass retort, and apply very cautiously a moderate lamp or sand heat. The salt first fuses, and then gradually parts with a considerable quantity of very pure oxygen gas. In this case the oxygen is disengaged from the chloric acid and also from the potassa, so that dry chloride of potassium is the sole residuum found in the retort."

Manufactured in larger quantities, for acidification and oxydation, oxygen may be evolved from much cheaper materials than the preceding. M. Deville's process, generally esteemed, consists in employing a number of earthenware retorts fixed on a furnace, similar to the retorts used for producing coal gas, and connected with a gasometer. In these retorts is placed a quantity of barytes, powdered silica, lime, and magnesia or alumina—50 per cent. of barytes being present. The mixture is kept at a dull red heat, and a stream of atmospheric air allowed to pass over it. Presently the barytes, which is protoxide of barium, will become converted into the peroxide of barium; that is, it will receive an accession of oxygen; and the heat liberating the oxygen, it will pass into the gasometer. There the steam arising from the aqueous particles of the mixture will be condensed into water; and whatever carbonic acid gas there may be present can be removed by adding lime.

Heat always causes the evolution of oxygen when present; but it must be *pure* heat; thus, the outer flame of a lamp will *rust* a metallic substance; the inner flame will either *melt* or consume it.

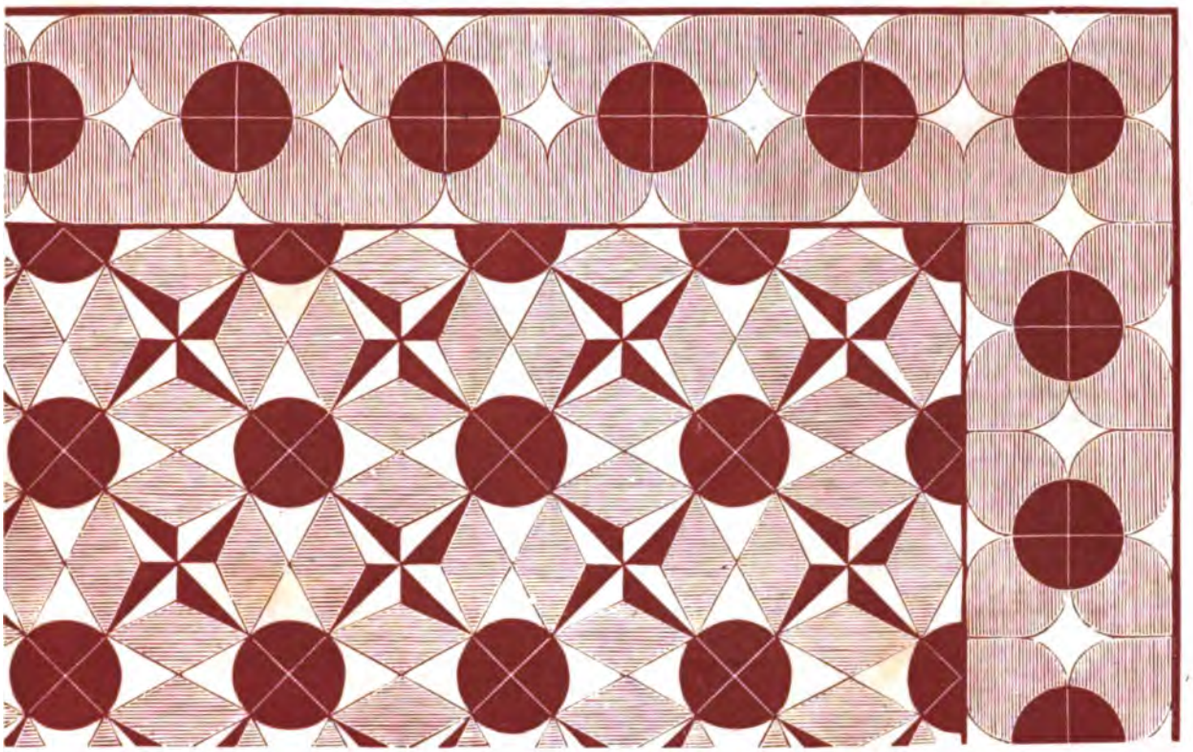
(*To be continued.*)

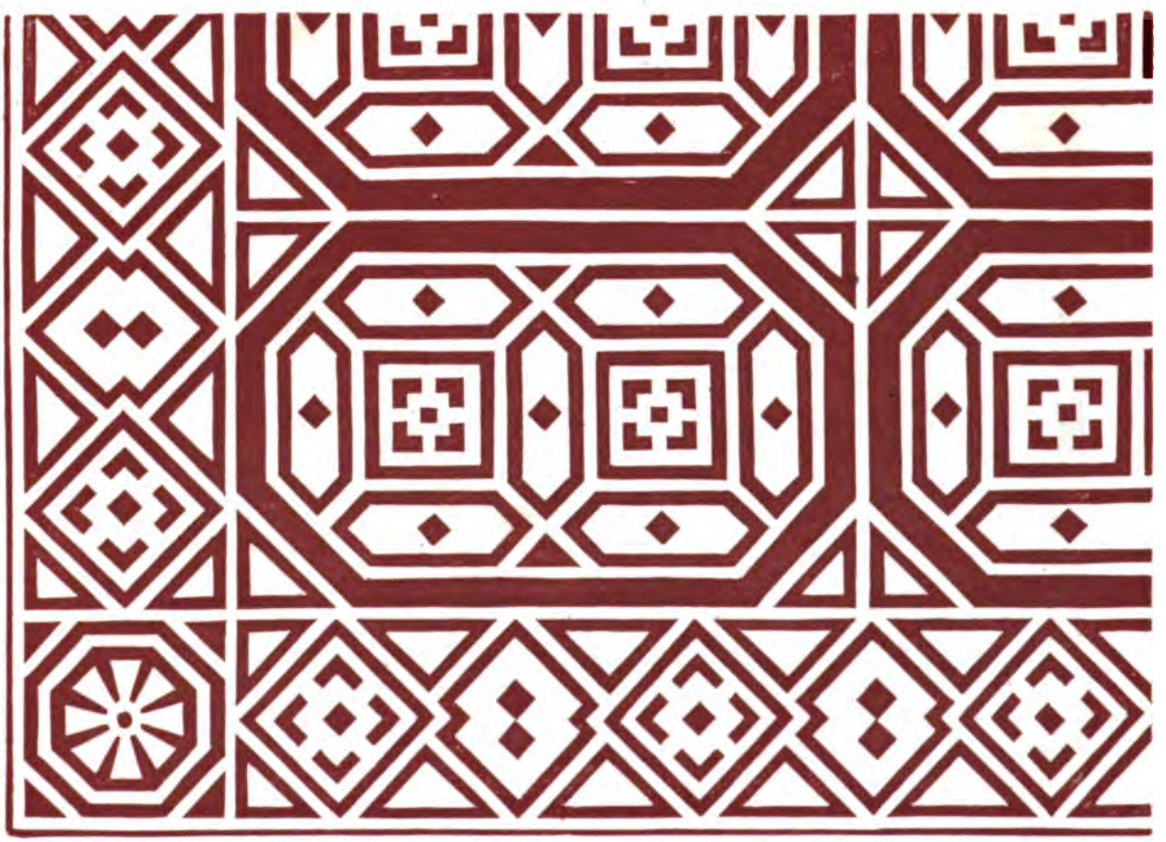
* Oxygen is only solidified when in combination.

MOSAICS.

Mr. Wyatt justly remarks that,—"In examining the nature of the subjects selected for representation in pictorial or imitative mosaic, the student cannot but be struck by the wide range embraced, and the evidence of intellect or of popular education—sometimes both—manifested in the selection or appropriation of the various themes. Gods, centaurs, men, animals, landscapes, flowers, ornaments, foliage, are depicted with almost equal ability; and we must remember that it is to the durability of the materials of which these almost imperishable relics are composed, we are indebted for the preservation of many of the lovely fancies of the great artists of antiquity, whose creations might otherwise have altogether passed away. Bearing in mind, too, the constant practice of reproduction and repetition prevalent among artists and artisans of old, we must not refuse to ascribe the invention, composition, and artistic treatment of any popular legend to a master mind, merely because we meet with its representation in fragments of coarse and perhaps ill-drawn mosaic, or in a mural painting indifferently executed." Great skill was shewn as well in the choice of subjects to suit the character of the apartment wherein the mosaic was placed, as in the adaptation of the lines to produce the best effect under varying circumstances. "The minute and frequently recurring patterns met with at Pompeii, in the cubicula, and in the smaller chambers, were adapted to give scale to the rooms; and, from their strictly regular and geometrical character, to cause the eye to dwell with increased pleasure on the flowing and playful forms of the paintings executed upon the walls;—in much the same way the rectilinear lines of the pavement of the Pantheon enhance the beauty of the graceful curves and its *lacunaria*." Mr. Wyatt remarks that the most ancient mosaic that has been discovered displaying Christian workmanship is probably the one found in this country at Horkstow, in Lincolnshire, where, in conjunction with the usual Roman frets and ornaments, are to be seen one of the monograms in use among the early Christians, and a repetition of the Ichthus, or fish, one of their earliest and most sacred symbols. This mosaic is supposed to be earlier than the time of Constantine the Great, and possesses the greatest interest. "The two earliest glass mosaics of the Christian era, which either exist, or of whose existence we have certain evidence," says our author, "possess an extraordinary interest in connection with the study of icinography. The most ancient—which was traditionally related to have been given to Prudentius, a Roman patrician by St. Peter, and which is referred to by Church writers of the fourth century, was stated by M. Frelet, at the *séance* held in 1841, at Lyons, by the French Society, 'for the preservation of monuments,' to be worthy of regard, as probably the primary type for the appearance of our Saviour; and he further observed, that the pious duty of imitating this mosaic in after examples was one of the great causes of the general resemblance of physiognomy in many of the portraits executed from that period until the ninth century."

BORDERS—GERMANESQUE.





TESSELLATED PAVEMENTS.

Mosaics.

GREAT antiquity is claimed for mosaics, not merely upon traditional authority, but from the evidence of specimens that have survived the devastation of time from the remotest ages. It is certain, however, that the Greeks and Romans especially excelled in this peculiar style of ornamentation. "The name," says Partington, "is sometimes supposed to be derived from Moses as the pretended inventor; sometimes from Musa, in the sense of elegance, beauty; and sometimes from μουσειον, museum (a grotto consecrated to the Muses), perhaps from the circumstance that mosaic work was first used in grottoes." Whatever truth there may be in the latter surmise, it is certain that mosaics were originally used for pavements; though, according to Labarte, "it soon sought to rival oil painting, and usurped its place in the embellishment of walls and the vaulted ceilings of churches."

The Byzantine Greeks preserved the art of mosaic work, in the fifth century, when the disruption of Italy threatened the extinction of the arts and sciences.

"The hardness and inflexibility of the coloured substances used in mosaic," again to quote Labarte, "have secured great stability to its productions; its colour experiences no change from the action of the sun, weather, or damp. These qualities have imparted to it an eminently historical character, and by transmitting types and signs with fidelity, it furnishes in Christian churches where it has been preserved a faithful pictorial tradition of ancient rites and customs."—We may add to this remark the observation of Domenico Ghirlandaio, that, "mosaics was the only painting for eternity."

Of the ancient construction of tesselated or mosaic work pavements, we have the following account given in the "Encyclopædia Britannica."

"A perfectly firm and level foundation was first formed either with flat stones secured with cramps, or a sort of stucco of sand, lime, and ashes, well mixed, and beaten together. Over this a thick coat of plaster was laid, on which, before hardening, the coloured tiles or squares of marble were arranged by the artist according to the design or picture placed before him. Those on a large scale are usually divided into several compartments, with figures of men or animals in the middle, surrounded by a sort of Arabesque border."

Not only was stone employed for this purpose, but glass and gems also.

After the Italian revival, the mosaic workers aimed almost exclusively at making elaborate copies of paintings in their seemingly intractable materials, and this necessitated and brought about great improvements in its mechanical processes. "Instead of the little stones and the cubes of glass of which mosaic works had been formerly composed, they now employed coloured enamels, reduced to strips of various forms and sizes, the different shades of which have been estimated at ten thousand. By means of these enamels, they were able to produce every colour, to emulate every half tint, and so represent every transition and degradation of tone. In works of small size, mosaic has succeeded in treating with inconceivably minuteness landscapes, buildings, and even portraits, and is enabled to render with the truth of painting skies, water, foliage, and even the lightness of the hair of animals."

Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

By FRANCIS BENJAMIN THOMPSON.

CHAPTER V. (*continued*). — INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Oxygen (concluded).—Oxygen gas was discovered by Dr. Priestley, in this country August 1, 1774, and was termed by him dephlogisticated air. About a year subsequently, it was recognised from independent research by Scheele, in Sweden. According to Graham, it owes its present name to Lavoisier.

Hydrogen (symbol H, equivalent 1·000, specific gravity 0·0694).—Hydrogen is the lightest of all the elements, transparent, colourless, and exceedingly inflammable. It is liberated from water whenever oxygen is abstracted from the latter; and it is a constant result of all organic decomposition. If a jet of steam be passed over red hot iron filings, the latter will combine with the oxygen of the vapour and retain it, while hydrogen will be set free. This experiment is most conveniently performed by aid of a gun barrel, in which the iron filings may be packed loosely, and steam passed through freely from end to end. The readiest means, however, of procuring hydrogen gas, consists in immersing iron or zinc filings in diluted sulphuric acid. About seven or eight parts of water, by bulk, to one of acid should be used.

The oxide of hydrogen is water (represented by the symbol HO).

Sulphur and hydrogen form sulphuretted hydrogen gas, whose deleterious effects on health and materials are well known. It has the smell of rotten eggs, and its presence is best detected by exposing a piece of paper rubbed over with acetate of lead to the suspected fume. If sulphuretted hydrogen be liberated, the paper will turn black.

Nitrogen (symbol N, equivalent 14·027, specific gravity ·9722).—This gas is colourless, inodorous, and uninflammable. It constitutes nearly 4-5ths of our atmosphere, which is a mechanical (not a chymical) combination of oxygen and nitrogen. Chymically combined with oxygen, nitrogen forms several compounds of the highest use in the arts. (See vol. i. p. 50). Nitric or nitrous acid is prepared by Messrs. Swindell and Nicholson's process as follows:—Nitrogen, in conjunction with oxygen gas, in equivalent volume (i.e., one volume of nitrogen to half a volume of oxygen) is passed through earthenware pipes heated to full redness, and filled with any porous substance that will stand the heat and action of the acid vapour produced. By this process, deutoxide of nitrogen is made, which is converted into nitric acid by being brought into contact with oxygen gas and the vapour of water.

Nitrogen gas itself may be prepared by dissolving 1oz. of sulphate of iron in 4 or 5 oz. of water. Pour the solution into a bottle; add 2 or 3 tablespoonsful of liquid ammonia; cork lightly, and shake now and then for half an hour. The air in the bottle, upon the cork being a little loosened at each shaking, will become pure nitrogen gas. The rationale of this process is that the black oxide of iron thrown down by the ammonia absorbs the oxygen of the atmospheric air contained in the bottle, and becomes changed into the red oxide, leaving the nitrogen behind.

(*To be continued.*)

Baptismal Fonts.

The sanctity rightly and reasonably attached to the consecrated instrument of a Holy Sacrament caused the careful preservation of fonts unchanged by centuries of rebuilding and alteration. Thus we cannot doubt that a considerable number of fonts now exist in England wherein the Saxon infant received the waters of salvation from the hand of that ancient priest whose bones, for aught we know, may moulder under the pavement of a church reconstructed on its original foundations six centuries after his death. Most frequently, however, the rude and unshapely font of this æra was replaced in later times by one of costly sculpture and profuse religious decoration; and thus we cannot find a very great number of examples of decidedly earlier date than the Norman æra, when fonts were made so elaborately beautiful and so quaintly curious that they well deserved the respect and value which they ever after received as works of art and memorials of bygone devotion, as well as from their hallowed use in the service of the Church. Thus Norman fonts are now common, while earlier specimens are but seldom found. Whether the former, many of which were certainly extremely plain, were always retained in rebuilding or improving an ancient church, we cannot tell; though we may fairly infer that such was generally the case. Probably the preservation or removal of early fonts was a custom more or less prevalent at different times and in different places, according to the facilities for procuring stone, or other local circumstances. The Decorated age, with all its costly and numerous buildings, produced comparatively few fonts; at least the fonts of this style are the least common, while, perhaps churches are most frequent.

In respect of execution, perpendicular fonts are unquestionably the best. It is a curious fact, that Decorated fonts are often the worst and coarsest specimens of sculpture and detail. Norman fonts are the most elaborate; but the designs are often as outlandish and extravagant as the carving is bad. Early English fonts are generally well cut; but they are of such unusual occurrence that it is difficult to assert as a prevailing principle their superior accuracy, though we believe they generally excelled in this respect. Transition-Norman fonts are frequently very handsome; and they often exhibit the toothed-moulding, as at Tickencote, Rutland, Norton, Derbyshire, Twyford, Leicestershire, and Barrow, in the same county. This ornament scarcely occurs in specimens of the pure Early English style, where it might be most expected. It is found, however, at St. Giles', Oxford.

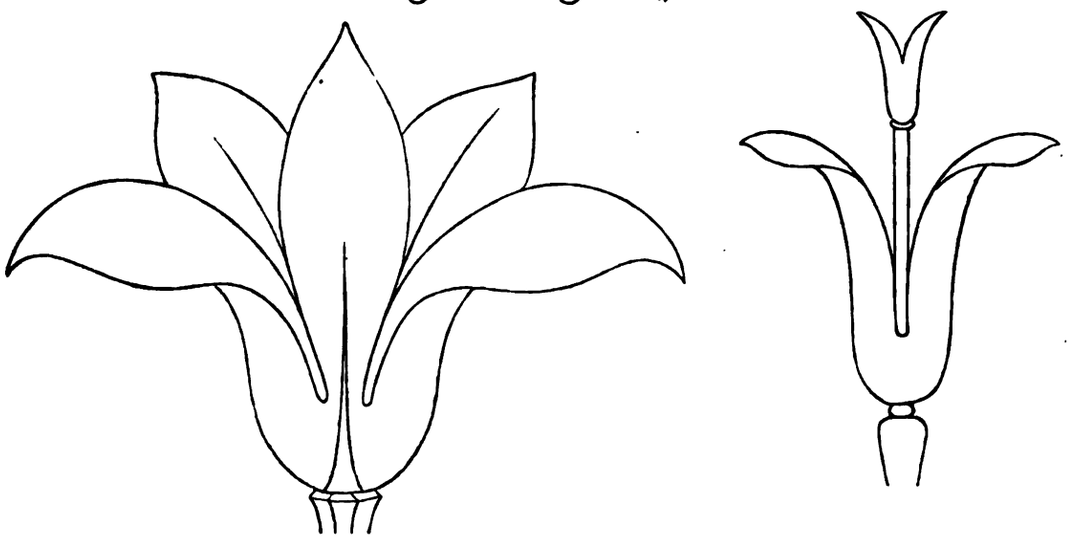
The earliest fonts are circular, either rude cylindrical stones, resembling a portion of a column, from which perhaps they were sometimes made, and placed without any intermediate support upon the ground; or worked in the shape of a clumsy vase or tub, as at Little Billing, Northampton, and West Putford; or mounted on a stem, as Chalk, Kent; sometimes quite plain, but more usually having a few broad and coarse annular base-mouldings. An interesting example occurs at Scartho, Lincolnshire, where the tower is Saxon. It is shaped like a hand-basin, and is placed on an irregular heptagonal plinth. Unhappily it is filled up with bricks and rubbish, and a small wooden pillar used for baptism.

In considering the shape of fonts, we must bear in mind the difficulty which the ancient builders experienced in raising and conveying large blocks of stone. We may reasonably suppose that the ready ingenuity which their works always exhibit in adapting material to constructive necessity, exercised considerable influence in this respect also. A rude piece of rock, forming naturally an irregular polygon, might become too small by being reduced to a square or an octagon; and if this had been procured with some labour and delay, it was better to humour its perverse tendencies, and to let it retain its original form with little alteration, than to spoil or reject it.

The position of fonts varies considerably. The principle, however, always observable is to place them near a western entrance. A very common site for Early English or Decorated fonts is on the west side of the nearest nave pier to the left as you enter by the south porch. Sometimes, where there is no north door, the font is placed against the north wall, as at Oakington and Long Stanton, Cambridgeshire; but this is not very common. Still more rarely is the font placed in the centre of the church, as at Castle Rising. The usual position of late fonts is a little to the east of the belfry arch, between two nave piers. The typical signification of proximity to a doorway, entrance into the Church by baptism, is well known. If a font is found anywhere eastward of the centre of the nave, it is almost sure to have been moved from its original place. At Milton near Cambridge it is against the chancel arch, and appears long to have occupied that unusual position.

The shape of the interior, or aperture, is almost always circular, irrespectively of the external form of the bowl. A very few foliated bowls occur, as at Wellow, Somerset, and Lenton, Nottinghamshire; an idea perhaps derived from the orifices of piscinæ. No example of an octagonal bowl has come to our knowledge, except those of Lanteglos, Cornwall, and Yate, Gloucestershire. Square apertures are not very uncommon in Norman fonts. For the diameter and depth of the bowl in ancient fonts no rule can be given: from one and a half to two feet wide by about one foot deep, seem the average measurements. One of the largest bowls we have met with is at Bradley, Lincolnshire, which is nearly a yard across. It is, however, well known that ancient fonts were made large enough for the complete immersion of infants. Exceptions to this all but universal practice are very rare; one or two instances are quoted in the Archæologia, vol. xi., p. 123. At Horbling and Dembleby, Lincolnshire, are extremely small and probably modern fonts formed out of a stem or shaft. The violation of the same principle, arising from the unhappy custom of aspersion now prevalent in the English Church, is one of the commonest and worst faults of modern usage. We have seen solid fonts, in which about a cupful of water would lie in a small cavity at the top. The general use of white basins and other paltry and irreverent expedients are too well known to need remark or comment. Modern fonts, until lately, when some very fine imitations of ancient models have been executed in stone, have generally been either pots of Wedgwood ware placed upon or under the altar, or at least within the altar rails, or in the chancel; or they have been meagre stone pedestals with a small white marble basin on the top, or perhaps Italian vases with all sorts of pagan devices upon them. These and such practices are fearful abuses both of common propriety and rubrical ordinances.

Rules for Drawing.



GREEK ORNAMENTS.

Technicologia.

110. *Stains for Marble.*—Marble may be stained or dyed of various colours by applying coloured solutions or tinctures to the stone made sufficiently hot to make the liquid just simmer on the surface. The following are the substances usually employed for this purpose:—Blue, tincture or solution of litmus, or an alkaline solution of indigo. Brown, tincture of logwood. Crimson, a solution of alkanet root in oil of turpentine. Flesh colour, wax tinged with alkanet root, and applied to the marble hot enough to melt it freely. Gold colour, a mixture of equal parts of white vitriol, sal ammoniac, and verdigris, each in fine powder, and carefully applied. Green, an alkaline solution or tincture of sap green, or wax strongly coloured with verdigris, or the stone is first stained blue and then the materials for yellow stain are applied. Red, tincture of dragon's-blood, alkanet root, or cochineal. Yellow, tincture of gamboge, turmeric, or saffron, or wax coloured with anotto. Success in the application of these colours requires considerable experience. By their skilful use, however, a very pleasing effect both of colour and grain may be produced.—*Cooley.*

111. *Page's Patent Method of Ornamenting Glass.*—This process consists in cutting on blocks the designs with which the surface of glass is to be ornamented, after the manner of blocks used in calico printing, paper-staining, &c.; or the designs are cut out of thin metal or other suitable material, as in stencilling. If cut on blocks, the blocks are dipped, and receive the colour from a sieve or roller, as in paper-staining. If the designs are cut out in metal or other plates, the colour is applied with a brush, and may be applied at once to the surface of the glass after it is prepared; but the following is preferred:—The surface of calico, paper, or other suitable material, is coated with size, gum, or starch, and when dry, the design is printed on it with colours made up in varnish, oil, or spirit. The size prevents the printed colours from entering the surface on which the design is printed, and when the whole is dry, it may be kept rolled up until wanted to be fixed on the glass. The glass is now prepared by taking off the polished surface with emery or other suitable material, and made quite rough, so that the first coat of varnish or cement may adhere well to the glass, which is then ready to receive a coat of white hard varnish, japan, copal, or other suitable body varnish, and when that is done, and before it dries, the surface of the printed design is turned down upon it and pressed down evenly. When quite flat, the back is wetted with water, and that softens the size, which allows the fabric, on which the design was printed, to come away, leaving only the printed design on the glass. The whole is dried off together, and then washed well in water to remove any size that may have passed in the transfer. The design or ornament now only requires hardening, and this is effected by placing the glass in a drying stove, oven, or other suitable apparatus; care must be taken that the heat is applied slowly and not carried high. The heat must never be carried beyond the degree the nature of the colours will allow without injury. It should be observed, that if the stencil mode is followed, the design can not only be applied at once on the glass, but can, like the block printing, be first applied on paper or any other suitable fabric previously coated with size, gum, or starch, and then transferred as before stated.

GLAZIERS' DIAMONDS AND CORROSIVE LIQUID.

The application of the diamond to cutting glass was, it is said, suggested by the well-known anecdote of Francis I., who in order to let the Duchess d'Estampes know that he was jealous, wrote the following lines on a pane of glass, which, says Le Vieil, may still be seen in his castle of Chambord:—

"Souvent femme varie
Mal habil qui s'y fie."

"The effect," he continues, "of the impression of one of the points of this diamond on the glass caused it to be remarked that the characters were not only engraved on it, but that the glass was actually cut; thus an accident proved that the diamond was adapted for cutting glass, and doubtless gave rise to the practice which soon became general." It is a pity to spoil so good a story by proving the invention to be older; but the truth must be told, and from a Bolognese MS. of the fifteenth century we learn that the art of cutting glass with a diamond was known and practised in Italy at the period when this MS. was written, that is more than a century previous to the time of Francis I. The art of corroding glass by means of an acid was known and practised contemporaneously with the last-mentioned invention. The directions for preparing the acid liquor are so clear as to place this beyond a doubt. "When," says the author of the MS. above referred to, "you wish to use this liquor, take equal quantities of each of these three waters, mix them together, draw with the mixed liquor upon the glass, and it will be cut exactly as you wish wherever it is wetted by this water." The fact of the three liquids being kept in separate bottles is a proof of their effects when mixed. The invention of this art has been attributed by Beckmann to Henry Schwanhard, glass cutter to the Emperor Rudolph, in 1670; and the invention is said to have originated in the following occurrence:—Some aqua fortis having one day fallen accidentally on the spectacles of Schwanhard, the glass was corroded by it, and from this he learned to make a liquid by which he could etch writing and figures upon plates of glass. Beckmann remarks that it is not known how Schwanhard prepared this liquid, and that "at present we are acquainted with no acid but that of fluor spar which will corrode every kind of glass."—*Mrs. Merrifield.*

GRAINING AND MARBLING.

The process of graining and marbling can be traced back at least as far as the time of James VI. of Scotland (1567—1603), in whose reign a room of Hopetoun Tower was painted in imitation of marble. Before that period imitations were done in stone colour, marble colour, wainscot colour, &c. In 1676, marbling was executed, as well as imitations of olive and walnut woods; and in 1688 tortoiseshell was copied on battens and mouldings. The doors of the chapel in Conduit St., Bond St., attracted much attention from the novelty of their being grained to imitate wainscot—done, perhaps, about the year 1810, when a new front was given to the building. From some letters in my possession, I find that mahogany was imitated in 1815 and maple wood in 1817. The imitating marbles and most kinds of woods has nothing very particular in its mode of execution, being similar to actual painting, the result depending more on natural taste than on mechanical skill. The process of graining is in the first instance the same as for ordinary painted work, but it requires more care in obliterating the marks of the brush. The last coat, instead of being flatted, is composed of equal portions of oil and spirit of turpentine, and is brought up to the colour characteristic of the wood to be imitated. The shades and grain are given by thin glazings of vandyke brown, burnt sienna, or umber, ground in water and mixed with small beer, which is a sufficiently glutinous vehicle; but imitation wainscot requires a thicker one, in order to receive the impression of the combs by which the grain is imitated. Thus, oak graining is executed with colour in turpentine, mixed with a little turpentine varnish; the work being covered with it, the combing is done without delay, as it dries very quickly. The lights are then taken out with a camel's hair brush, or a rag moistened with turpentine, and rubbed clean. In cheap work the operation ends here, and the surface is covered with copal varnish to protect it; but good work is "over-grained," that is, a glaze of colour in beer, as dark as may be requisite, is laid over the combed work, in shades thrown across the work. Sometimes the whole panel is laid in with this glaze, and the lights taken out with a sponge, a brush is then used to lighten the edges; when quite dry, the work is over-grained with the same colour laid on thin and softened off. For graining wainscot in oil, bees'-wax is used instead of varnish to the colour, mixed in equal quantities of turpentine and oil; one, two, or three coats of a good oil varnish, such as copal, are applied when the coat is quite dry.—*Wyatt Papworth.*

GOTHIC ARCHITECTURE.

It is not necessary to seek abroad for the origin of the pointed arch, the progress of which we can distinctly trace at home in the twelfth century. About this time many illustrious Norman prelates (chiefly in our own country), exhausted their talents and their wealth in carrying the magnificence of their churches and other buildings to the highest degree. Henry, Bishop of Winchester, probably contributed most to the improvements which gradually changed the early Norman architecture into the style called "Gothic." The Normans admired height no less than length, in the construction of their churches, and used to pile arches and pillars on each other. By way of ornament and variety they often imitated these arches and pillars on their walls, and they sometimes caused these plain round arches to intersect each other. The windows having been made very narrow at the first adoption of the pointed arch, it became necessary sometimes to place two or three of them close to each other. This disposition of the two or three windows occasioning a dead space between their heads, a trefoil or quatrefoil was introduced between them. The effect of this simple ornament caused it to be introduced into the arches themselves, so that there is hardly an arch or resemblance of an arch of any kind, from the days of Edward the Second to those of Henry the Eighth, which is not ornamented in this manner. The trefoil by an easy addition became a cinquefoil, and being made use of in circles and squares, produced fans and Catherine wheels. To the large roses or circular windows, which prevailed about the time of Edward the First, it was necessary that numerous divisions, or mullions, should be added, which, as well as the ribs and and transoms of the vaultery began to ramify into a great variety of tracery, according to the architect's taste; all of them uniformly ornamented with the trefoil or cinquefoil head. That magnificent object, a grove of tall trees, was very naturally and beautifully imitated in the aisles of the cathedrals of this light architecture: the ribs of the vaulting, springing from the tops of the tall pillars, and meeting in the pointed arch in the roof, produced a fine effect; and, pursuing this idea, the lightness of all the parts, and the rich variety of tracery, contributed to make the resemblance more perfect.

CIPHERS.

SCREEN (GOTHIC).

Shell Cameos.

ENGRAVED figures, in low relief on different kinds of silicious stones, possessing layers of different colours, so that the figures, or the different parts of the same figures, are of divers colours, are cameos. Such cameos are now made in Southern Europe, and also in France, where this art has lately been attempted to be revived; but the hardness of the materials requires so much labour to be employed in the fabrication that the *cameo dur* (the name given to this imitation in France) is too expensive to come into general use. Many attempts have been made here, and in other parts, to introduce substitutes for the ancient cameos, such as different kinds of porcelain and glass. Their great inferiority has, however, caused them to be neglected, and the best and now most usual substitutes are the shells of molluscous animals; several kinds of these animals afford the necessary varieties of colour, and are at the same time sufficiently soft to be worked on with ease, and hard enough to resist wear, and to last for a long period of time. It was formerly the custom, especially in Holland, to use for this purpose the pearly nautilus, and several kinds of turbines or wreath shells, which have an opaque white external coat over an internal pearly one. These have now almost entirely gone out of fashion, and are rarely to be met with, except in the cabinets of the curious; but they must have been much esteemed formerly, for Seba and Rumphius figure many specimens which were contained in their collections. The shells now used are those of the flesh-eating univalve (*gasteropoda ptenobranchiata zoophaga*) which are peculiar for being all formed of three layers of calcareous matter, each layer being composed of three perpendicular laminæ, placed side by side; the laminæ composing the central layer being placed at right angles with one of the inner and outer ones; the inner and outer being placed longitudinally with regard to the axis of the line of the shells, while the inner laminæ are placed across the axis, and concentrically with the edge of the mouth of the cone of the shell. This structure gives great strength to the shell, and thus affords more protection to the animal; it also furnishes the cameo-cutter with the means of giving a particular surface to his work; for a good workman always carefully puts his work on the shell in such a manner that the direction of the lamina of the central coat is longitudinal to the axis of his figure. In cameos the central layer forms the body of the bas relief, the inner lamina being the ground, and the outer one the third or superficial colour which is sometimes used to give a varied appearance to the surface of the figures. The cameo-cutter selects for his purpose, first, the shells of this kind which have the three coats or layers composed of different colours, as these afford him the means of relieving his work; and, secondly, those which have the three layers strongly adherent together; for if they separate, his labour would be lost. The kinds now employed, and which experience has taught them are best for their purpose, are the bull's mouth, *cassis rufum*, which has a red inner coat, or what is called a sardonyx ground; the black helmet, *cassis Madagascariensis*, which has a blackish inner coat, or what is called an onyx ground; the horned helmet, *cassis cornutum*, with a yellow ground; the queen conch, *strombas gigas*, with a pink ground. The bull's mouth and the black helmet are the best shells: as the horned helmet is apt to separate from the ground, or "double," as the French workmen call it; and the last, or queen conch, has the two colours seldom distinctly marked from each other, and the pink of the ground colour easily flies by exposure to the light. The red colour of the bull's mouth only extends a slight distance in the mouth of the shell, becoming paler as it proceeds backwards, as may be observed by the pale side which is generally to be observed in each red-grounded cameo. The dark colour extends further in the black and yellow kind; hence the bull's mouth affords only a single cameo large enough to make brooches, and several small pieces for shirt studs; and the black helmet yields on an average about five brooches, and several pieces for studs; and the queen conch only one good piece. The manufacture of shell cameos has been carried on in Rome for upwards of fifty years; it was confined to Italy until the last twenty years, at which period an Italian commenced the making of them in Paris. Little progress was, however, made until the last twenty years; but, at the present time, a much greater number are made in Paris than in Italy.

Heraldic Blazonry.

(*Continued from page* 4.)

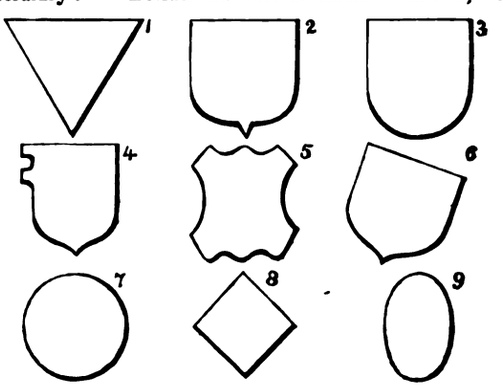
1. The triangular shield, which is to be met with on the most ancient monuments, coins, and shields. It is by the French called l'ancien e'cu, and many of our heralds designate it the ancient shield.

2. This is the common British, French, and German shield.

3. The Spanish and Portuguese shield.

4 and 5. German notched shields. They are not in favour with heralds.

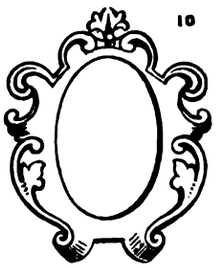
6. The explanation of the peculiar position of this shield is thus given by Nisbet in his "System of Heraldry:"—"Besides the various forms of shields, we



find them also frequently distinguished by their different positions—some being carriede rect and others pendant, or hanging by the right or left upper corner. The reason given for it is, that when tiltings and tournaments were proclaimed, they that were to just in these military exercises were obliged to hang up their shields of arms some days before the time of exercise along the windows and balconies of the houses near the place of action, in order that the judges might know the ensigns of the actors. Columbier says, that they who were to fight on foot had their shields hung by the right corner, and they on horseback by the left."

7. Circular shield; seldom used.
8. The Lozenge shield. Used by women, and for funeral hatchments.
9. The oval or Italian shield.

10



10. The Cartouch, used by those who have no right to carry arms on formal shields.

The surface of the shield is called the field, and its parts are represented by the following diagram :—

A B C. The chief or head, which should occupy exactly one-third part of the escutcheon. A is the dexter or right hand chief point, B is the middle chief point, and C the sinister or left hand chief point.

D. Collar or honour point.

E. The heart or fess point.

F. Nombril or navel point.

G H I. The bases, of which G is dexter base point, H middle base point, and I sinister base point.

(To be continued.)

Technicologia.

112. *Losh's Patent Waterproof Varnish.*—Boil nearly equal weights of carbonate of soda or potassa and lime, adding a considerable quantity of water to the mixture, in an iron vessel, heated by steam. After boiling two hours, allow the lime to settle, and the clear solution is ready for use. Into another iron vessel put a quantity of stearine or resin, and add as much of the clear alkaline solution as will render it soluble. Boil by steam for about 6 hours, allow it to cool, and add about 100 gallons of water for each cwt. of the stearine or resin solution. Filter carefully through cotton cloth and add dry chloride of lime in the proportion of 1lb. of the chloride to every 20lbs. of the stearine or resin. This causes a white insoluble precipitate, which must be washed in an acid solution, afterwards with water, and again filtered. When required for use, it must be dissolved in a spirit, or essential oil, or naphtha, or rendered viscid by ammonia.

113. *Gums.*—Gums are the mucilaginous portion of vegetables, transparent, brittle (yet pulverisable with difficulty), insipid or slightly sugary taste, soluble in any proportion in water, with which they form tenacious cements, and immediately coagulable by mixture with alcohol, in which they are perfectly insoluble, as they are also in oil. An acetous fermentation rapidly sets up in any aqueous solution of gum, unless hermetically sealed. Gum copal, gum sandarach, &c., are wrong terms, as they are not gums at all. The principal genuine gums are—1. Such as are obtained from plum, peach, and cherry trees. 2. Gum Arabic, a natural emission of the Egyptian and Arabian acacia. 3. Gum Senegal, which is more transparent and adhesive in solution than gum Arabic. It may always be recognised by its very great clearness. 4. Gum tragacanth, which is obtained from the Syrian tragacanth plant. It forms a very thick mucilage with water. The root of the common blue bell, according to Mr. Willis, yields a mucilaginous matter equal to gum Arabic, as also does that of several other plants, such as vernal squill, white lily, orchis, and lichens.

114. *Oil of Brick.*—The light oil produced by distillation of fat oils, is naturally more disposed to fly off by heat and leave less residuum than the fat oils themselves. This property renders it useful in some of the arts, as those of the lapidary, seal engraver, and others, who grind precious stones by the aid of fretting powders. The oil used for this purpose is known by the name of oil of brick, which is made by submitting pieces of brick to a white heat, then plunging them into olive oil, and afterwards recovering the oil they have imbibed by distillation.

115. *Mrs. Cunnington's Patent Decorations for Panels, &c.*—Plants, preferably of a filamentous character, as mosses, ferns, or other cryptogamous species, are taken freshly gathered, spread out on sheets of paper, and arranged so that after being submitted to pressure, they will present a graceful and artistic appearance. When pressed and dried they are to be dyed or coloured or coated with gold or silver, according to the tone of decoration required to be produced. After being thus treated, these specimens of natural productions are arranged on a plain or coloured ground, either in groups or in the form of wreaths or borders. Over the decoration thus produced, a plate of glass or talc, or a sheet of pure gelatine is applied; and when thought desirable, the under surface of the material forming the transparent covering is ornamented with border lines or other devices, to heighten the effect of the decoration. In some cases the finer portions of feathers, after being bleached or coloured or coated with some metallic tissue, are employed—the same being arranged, either alone or in combination with the vegetable filaments, leaves, and flowers, to form ornamental devices for the enrichment of surfaces, after the manner and having the appearance of inlaying. In selecting the plants for producing the ornamental devices above indicated, those are preferred which, when pressed and dried, present to the eye an inappreciable thickness, for, in that case, little or no shadow is cast therefrom by a sidelight, and, consequently, a closer imitation of inlaid work is obtained. For the same reason, it is preferable to employ an opaque ground to receive the prepared specimens. In some cases, however, as when the specimens are, or have the appearance of being, aquatic plants, silvered glass is used as the ground, whereby a reflection of the under side of the plants is obtained.

CORRESPONDENCE.—*Maple.*—A correspondent, "E. T. J." has put to us the following question:—"Could you inform me what to use to stain and polish maple wood a gray or lilac colour? I have seen some," he adds, "which I believe came from Paris, and it shewed up the grain of the wood to great perfection." Can any of our readers oblige us with the requisite information?

Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

By FRANCIS BENJAMIN THOMPSON.

CHAPTER V. (*continued*). — INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Nitrogen (*concluded*).—Nitric acid and sulphuric acid, mixed, constitute aqua fortis; nitric acid and hydrochloric acid, mixed, form aqua regia. In combination with hydrogen and bromic acid, nitric acid forms the compound known as nitrohydrobromic acid. All these are used as solvents of various metals.

The free state and abundance of nitrogen in the atmosphere causes a chymical action, which is of very serious importance to decorators and fresco painters in relation to works of art, and generally to the public as an element of considerable danger from fire. This is the production of saltpetre,* or nitrate of potassa. It has long been noted that nitrate of potassa is spontaneously developed wherever lime, organic matter, and a hot and dry atmosphere are present, as in compost heaps, and in soils during the natural decay of the manure applied. Limewashed walls, also, commonly exhibit an efflorescence composed of crystals of saltpetre. With regard to fresco paintings, executed upon lime grounds, this efflorescence is often the cause of the complete destruction of the pictures (*see* "Athenæum," July 14, '55, p. 817). Woodwork limewashed is exceedingly dangerous, as in time it must become surrounded by an inflammable scarcely inferior to gunpowder. In former times, officers, called "saltpetre men" were appointed by government in this country to collect the saltpetre accumulated under the earthen floors of farmhouses, &c., for the purpose of manufacturing gunpowder for the king's service; and on the continent, even to this day, many of the farmers have it stipulated in their leases that their lands must be enclosed by limestone or plastered fences, to be placed at the disposal of the government in the event of saltpetre being required. Napoleon I., at the beginning of his military career, depended exclusively upon such sources for the supply of saltpetre.

Pure nitric acid consists of 1 equivalent of nitrogen, = 14, added to 5 equivalents of oxygen = 40. Thus, its equivalent is 54, and its symbol NO^5. It is intensely acid and entirely colourless. In its most concentrated form it is half again as heavy as water. In this state it contains 25 per cent. of water, and, therefore, adding 2 equivalents of water, = 18, to that of the NO^5, = 54, the equivalent of the concentrated acid is 72. It will combine with water in any larger proportion.

(To be continued.)

* The term "neter," translated nitre, is found in the Old Testament, Prov. xxv. 20; Jeremiah ii. 22. Herodotus and Theophrastus use the word νιτρον, and Pliny the word nitrum; but these authors seem to mean natron, quite a different substance from our nitre. Geller ("Invention of Verity," xxiii.) is the first who distinctly mentions our nitre or saltpetre. The term "saltpetre" is evidently derived from sal petræ, literally signifying rock salt.—*Dr. J. Scoffern.*

BRACKET.

Mechanical Drawing.

A flat rectangular board is first to be provided, of any convenient size, as from 18 to 30 inches long, and from 16 to 24 inches broad. It may be made of fir, planetree, or mahogany; its face must be planed smooth and flat, and the sides and ends as nearly as possible at right angles to each other—the bottom of the board and the left side should be made perfectly so; and this corner should be marked, so that the stock of the square may be always applied to the bottom and left hand side of the board. To prevent the board from casting, it is usual to panel it on the back or on the sides.

A T square must also be provided, such that by means of a thumb-screw fixed in the stock, it may be made to answer either the purposes of a common square or bevel—the one-half of the stock being movable about the screw, and the other fixed at right angles to the blade. The blade ought to be somewhat flexible, and equal in length to the length of the board.

Besides these, there will be required a case of mathematical instruments, in the selection of which, it should be observed, that the bow compass is more defective than any of the other instruments. After using any of the ink feet, they should be dried; and if they do not draw properly, they ought to be sharpened and brought to an equal length in the blade by grinding on a hone.

The colours most useful are, Indian ink, gamboge, Prussian blue, vermilion, and lake. With these, all colours necessary for drawing machinery or buildings may be made.

Hair pencils will also be necessary, made of camel's hair, and of various sizes. They ought to taper gradually to a point when wetted in the mouth, and should, after being pressed against the finger, spring back.

Black-lead pencils will also be necessary. They ought not to be very soft nor so hard that their traces cannot be easily erased by the Indian rubber. In choosing paper, that which will best suit this kind of drawing is thick, and has a hardish feel, not very smooth on the surface yet free from knots.

The paper on which the drawing is to be made, must be chosen of a good quality and convenient size. It is then to be wet with a sponge and clean water, on the opposite side from that on which the drawing is to be made. When the paper absorbs the water, which may be seen by the wetted side becoming dim, as its surface is viewed slantwise against the light, it is to be laid on the drawing board with the wetted side next the board. About half an inch must be turned up on a straight edge all round the paper, and then fastened on the board. This is done because the paper when wet is enlarged, and the edges being fixed on the board act as stretchers when the paper contracts by drying. To prevent the paper from contracting before the paste has been sufficiently fastened by drying, the paper is usually wetted on the upper surface, to within half an inch of the paste mark. When the paper is thoroughly dried, it will be found to lie firmly and equally on the board, and is then fit for use.

If the drawing is to be made from a copy, we ought first to consider what scale it is to be drawn to. If it is to be equal in size to, or larger than the copy, a scale should be made accordingly, by which the dimensions of the several parts of the drawing are to be regulated. The diagonal scale, a simple and beautiful contrivance, will be here found of great use for the more minute divisions; and whenever the drawing is to be made to a scale of 1 inch, ½ inch, ¼ inch to the foot, a scale should be drawn of 20 or 30 equal parts; the last of which should be subdivided into 12, and a diagonal scale formed on the same principle as the common one, but with eight parallels and 12 diagonals, to express inches and eighths of an inch. For making such scales to any proportion, the line L on the sector will be found very convenient.

Great care should be taken in the penciling that an accurate outline be drawn, for on this much of the value of the picture will depend. The pencil marks should be distinct, yet not heavy, and the use of the rubber should be avoided as much as possible, as its frequent application ruffles the surface of the paper.

The drawing thus made of any machine or building is called a plan. Plans are of three kinds—a ground plan, or bird's-eye view, an elevation or front view, and a perspective plan.

When the outline is completed in pencil, it is next to be carefully gone over with Indian ink, which is to be rubbed down with a little water, on a plate of glass or earthenware—so as to be sufficiently fluid to flow easily out of the pen, and at the same time have a sufficient body of colour. While drawing the ink lines, the measurements should all be repeated, so as to correct any error that may have slipped during the penciling. The screw in the drawing pen will regulate the breadth of the strokes; which should not alike be heavy; those strokes being the heaviest which bound the dark part of the shades. Should any line chance to be wrongly drawn with the ink, it may be taken out by means of a sponge and water, which could not be done if common writing ink were employed.

In preparing for colouring it is to be observed, that a hair pencil is to be fixed at each end of a small piece of wood, made in the form of a common pencil, one of which is to be used with colour, and the other with water only. If the colour is to be laid on, so as to represent a flat surface, it ought to be spread on equally, and there is here no use for the water brush; but if it is to represent a curved surface, then the colour is to be laid on the part intended to be shaded, and softened towards the light by washing with the water brush. In all cases it should be borne in mind, that the colour ought to be laid on very thin, otherwise it will be more difficult to manage, and will never make so fine a drawing.

In colours even of the best quality, we sometimes meet with gritty particles, which it is desirable to avoid. Instead of rubbing the colour on a plate with a little water, as is usual, it will be better to wet the colour, and rub it on the point of the forefinger, letting the dissolved part drop off the finger on to the plate.

In using the Indian ink it will be found advantageous to mix it with a little blue and a small quantity of lake, which render it much more easily wrought with, and this is the more desirable as it is the most frequently used of all the other colours in mechanical drawing, the shades being all made with this colour.

The depth and extent of the shades will depend on various circumstances—on the figure of the object to be shaded, the position of the eye of the observer, and the direction in which the light comes, &c. The position of the eye will vary the proportionate size of any object in a picture when drawn in perspective. Thus, if a perspective view of a steam-engine is given, the eye being supposed to be placed opposite the end nearest the nozzles, an inch of the nozzle rod will appear much larger than an inch of the pump rod which feeds the cistern; but if the eye is supposed to be placed opposite the other end of the engine, the reverse will be the case. But in drawing elevations and ground plans of machinery, every part of the machine is drawn to the proper scale—an inch or foot in one part of the machine, being just the same size as an inch or foot in any other part of the machine. So that by measuring the dimensions of any part of the drawing, and then applying the compass to the scale, we determine the real size of the part so measured. Whereas, if the view were given in perspective, we would be obliged to make allowance for the effect of distance, &c.

The light is always supposed to fall on the picture at an angle of forty-five degrees, from which it follows, that the shade of any object, which is intended to rise from the plane of the picture, or appear prominent, will just be equal in length to the prominence of the object.

The shades, therefore, should be as exactly measured as any other part of the drawing, and care should be taken that they all fall in the proper direction, as the light is supposed to come from one point only.

It is frequently of great use for the mechanic to take a hasty copy of a drawing, and many methods have been given for this purpose—by machines, tracing, &c. We give the following as easy, accurate, and convenient.

Mix equal parts of turpentine and drying oil, and with a rag lay it on a sheet of good silk paper, allowing the paper to lie by for two or three days to dry, and when it is so it will be fit for use. To use it, lay it on the drawing to be copied, and the prepared paper being nearly transparent, the lines of the drawing will be seen through it, and may be easily traced with a black lead pencil. The lines on the oiled paper will be quite distinct when it is laid on white paper. Thus, if the mechanic has little time to spare, he may take a copy and lay it by to be recopied at his leisure.

ARABESQUE CAPITALS.

RIBAND ALPHABET.

Guilloches.

SEVERAL derivations have been given of this name, and its English orthography is not at all settled — some writing guiloche or guilochos, others guilloche; while guillochi is not an unfrequent expression. By us the term is derived directly from the French guillochis, and the etymology of that word is traced by a writer in the "Encyclopædia Britannica" to the Greek γυιον, a member, and λοχος, a snare—implying a net-like ornament.

A guilloche is essentially composed of interwoven curved lines, in that respect differing from a fret, in which the lines are disposed at right angles to one another. The exact definition is thus supplied in Gwilt's "Encyclopædia of Architecture":—"An ornament in the form of two or more bands or strings, twisting over each other, so as to repeat the same figure, in a continued series, by the spiral returnings of the band."

Guilloches were first used in classical architecture to ornament the torus, of which we have given an illustration. They are now, however, applied to various purposes, such as the bordering of ceilings, the sofits of beams, &c. Custom has also allowed the admixture of independent ornaments with the interwoven curved lines.

Although guilloches are merely geometrical combinations, there is room for considerable displays of ingenuity in their production. They are susceptible of enrichment in every architectural style wherein scroll work is admissible.

Imitation.

We say that a man imitates when either his ideas or actions are not properly of his own origin, but are reflected from those of any other individual; and this may take place in a variety of ways: the child imitates those around him in manner and language and way of thinking. His imitation, in fact, reduces itself to mimicry, for he has no power of reasoning on the strength or weakness of the motives which lead to what he sees done: no faculty of judgment by which he may be enabled to discriminate between proper and improper modes of expression; no experience to teach him the danger of indulging such or such modes of thought. He feels himself subjected to certain wants and desires, and he is urged by these to acquire the method of expressing them, in order that they may be administered to; besides which, the strong principle of emulation and thirst for knowledge impel him almost blindly onward in the course we have adverted to.

But as the child casts off his puerility, and advances towards manhood—as his intellect expands, and he acquires the faculty not only of observation, but also of comparing and analysing that which he observes, the headlong principle of imitation is thrown aside as unworthy of a thinking creature; and such things only are adopted as appear to be so by the weighing and reflecting power of reason.

> "Thus of the child a boy, the boy a man,
> Eager to run the race his fathers ran."

It is, therefore, sufficiently obvious, that a servile copy of the actions or opinions of another man—whether adopted blindly and without being impressed with a sense of the wisdom, virtue, and talent of the person copied; or, on the other hand, whether the choice of a model has proceeded from reflection and a deep conviction of the worthiness of such individual, but without having regard to difference of circumstance requiring various modifications, is alike degrading to the judgment and ability of the copyist.

There is, however, a species of imitation which is praiseworthy and honourable—it is that which is usually expressed by the word *free*. In this case, the copyist selects and adopts his model, but sets himself seriously to discover in what points his own work deviates from the nature of that he has placed before him; he exercises the same judgment, by aid of which he had formed his selection, in discarding such particulars as do not seem to harmonise with the whole: if he is endeavouring to imitate the benignity and virtue of some good man, he weighs well his own means, together with the shades of difference, whether constitutional or habitual, that discriminate their characters: if he is following in the course of some eminent artist, he is careful not to be seduced into errors by the brilliancy of a great name, nor to forfeit his own inherent right of opinion and imagination. Thus a work conducted on similar principles to any preceding one, may deserve a far better reputation than that of mere imitation. It may, indeed, by a thoughtful and intelligent execution of its different parts, almost merit the praise of originality. It was thus that Plautus and Terence imitated the Greek comedy.

Having made these general observations on the principles of imitation, we will in a few words apply what has been said more especially to the fine arts. According to some critics, *all* is here imitation. The imitation of nature consists in their very essence, and they please or offend but as this is true or untrue. In this opinion, there is much truth and some error.

It is true, that the works of the painter or sculptor give pleasure by their lively resemblance to what is natural and real; but, as we have observed before, it is true in a modified sense. Were this otherwise, the performances of Gerard Dow, of Teniers, and other masters of the Dutch school, would be far more excellent and admirable than those of Raffaële, of Michelangelo, and the other great names that throw lustre over the history of Italian art; but, in point of fact, it is the splendour of imagination, the creative, and not the mere imitative power, that has affixed to these immortal works the surpassing fame which they have, and will still continue to possess.

If the painter or the sculptor should employ himself only in making close copies of the different objects of a pleasing kind which surround him in nature, and if his success were to be estimated simply in proportion as these resemblances were exact, he would be degraded into the character of a mere draughtsman. There are a multiplicity of objects agreeable in nature which are not at all calculated for introduction into a work of art, in the same way as many colloquial phrases, quite proper, and even happy in conversation, are unfitted to the gracefulness of poetry, or dignity of eloquence. It is the selection—the combination—the fancy displayed; it is these things, added to a just eye for verisimilitude, that constitute the artist's greatest success, and characterises his highest achievements.

Let not the young artist hesitate to mould his style on that of some eminent predecessor; or rather let him strive to collect from the works of each of the great mas-

ters in art, the peculiar charm by which he was rendered conspicuous, and blend them, so far as may be consistent and harmonious, in his own composition. Let him remember that this kind of imitation has been recommended and adopted by the most illustrious names; and that even Raffaële himself was indebted, for the main design of his two majestic figures of St. Paul,—namely, the one preaching at Athens, and the other punishing Elymas, the magician, to Massaccio, a preceding painter.

Heraldic Blazonry.

(*Continued from page* 22.)

"It is observable in sculptured shields," says Dallaway, "that they are affixed by a bandage to hooks, or suspended upon branches of trees. In one of the oratories of the cathedral at Gloucester, is a specimen of two shields so placed on either side a crowned head, which supports the pedestal of a niche. The most ancient mode of the introduction of sculptured escutcheons into the internal decoration of churches, was under the brackets of the cross springers of vaulted roofs, upon the spandrils of the subsellia, or stone benches near the altar, and on the compartments of fonts, surrounded by rich tracery and foliage."

Tinctures in heraldry are the various colours borne on the shield. They consist, firstly, of two metals—or, gold (fig. 1), and argent, silver (fig. 2). All tinctures are represented in drawing or engraving, where colours are not used, by peculiar lines, dots, &c., which are shewn on the various figures following:—

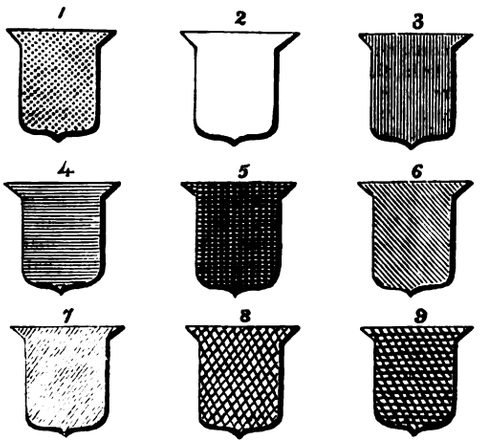


Fig. 3, gules—red; 4, azure—blue; 5, sable; 6, vert—green;* 7, purpure—purple; 8, tenne, tawny, or brusk—orange; 9, sanguine—dark red, or murrey.

Where precious stones are used instead of metals and tinctures, the following correspond in signification:—or, topaz; argent, pearl; gules, ruby; azure, sapphire; vert, emerald; sable, diamond; purpure, amethyst; tenne, jacynth; sanguine, sardonix. The metals and tinctures are thus exhibited in engraving:—Or, dots; formerly represented on the field by the letter O. Argent, a blank; anciently the letter A. Gules, perpendicular lines; formerly the letter R. Azure, horizontal lines; formerly B. Sable, perpendicular and horizontal lines crossed; formerly S. Vert, diagonal lines from right to left; formerly V. Purpure, diagonal lines from left to right; formerly P. Tenne, diagonal lines from right to left, and from left to right. Sanguine, horizontal lines, crossed by diagonal ones from right to left.

The system of representing tinctures by lines and dots was the invention of Silvester de Petra Sancta, an Italian author of the 17th century. "This mode of expressing the colours of Heraldry was as early as the time of Charles II., as appears by engravings at that time; but was not adopted on seals till about the reign of Queen Anne; and not in architectural decorations till our own times, when the fashion of imitating styles of the middle ages has become prevalent. It is amusing to the heraldic eye to discern that, amidst all the care taken to copy the details of the *Gothic* style in church building, the heraldic shield is disfigured by adopting the lines used to denote heraldic tinctures, at once proclaiming a barbarous anachronism, if no other incongruity existed."*

Or may be represented by liquid gold, gamboge, chrome, or king's yellow; shading, burnt sienna. Argent is white, shaded by Indian ink or lamp black. Gules vermillion; shading, lake. Azure, verditer, smalt, or ultramarine; shading, indigo. Sable, lamp or ivory black; shading, same with gum. Vert, verditer and gamboge mixed; shading, gamboge and indigo. Purpure, royal purple; shading, same with gum. Sanguine, dark red. Tenne, red and yellow mixed.

(*To be continued.*)

* This tincture is sometimes called sinople, from the town of Sinople in the Levant, where the best green pigment and dye stuff was formerly found.

NELSON'S LIONS.

There is a curious statement in the *Observer*, respecting the lions for which the pedestals have been so long waiting in Trafalgar Square. It appears that Mr. Milnes, the sculptor of Euston Road, has started a public exhibition of some lions originally designed to form the base of the Nelson column, and which were rejected by the committee appointed to conduct the competition. The *Observer* is very indignant at this slight, as it chooses to esteem it; it describes the lions as remarkably fine animals—couchant. Now, in our humble judgment we should suppose that a couchant lion, or a couchant anything else, was diametrically opposed to the memorialship of heroism. In heraldry, the posture is the most degraded of any, and although ignorant limners will persist in representing the supporters of the royal arms in the attitude of slumber, one might naturally expect better taste and feeling in a sculptor who essays to win not merely a pecuniary prize, but one of immortality. Nelson's lions—or lions intended to celebrate the achievements of such men as Nelson—should be rampant, presenting their boldest fronts and most majestic aspects, not coiled up like a parcel of cats.

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* "Encyc. Brit." 8th edit.

Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

By FRANCIS BENJAMIN THOMPSON.

CHAPTER V. (*continued*). — INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Chlorine. (Symbol Cl, equivalent 35·517, specific gravity nearly 2·5000). This is a green-yellowish gas, very pungent to the smell, and producing a suffocating sensation when inhaled. Its name was given by Sir H. Davy from the Greek χλωρος, green. It is itself uninflammable, but is a supporter of combustion. Its most notable properties are that it destroys or blanches all organic colours, and that it is very efficient in hiding bad smells. We say "hiding" in relation to this latter property, because there is good reason to believe that in very many cases it is only the stronger stench of chlorine that acts in disguising more fœtid but weaker odours.

Chlorine gas may be readily made, by taking 1 oz. of black oxide of manganese, and 3 oz. of common salt, mixing them with two or three spoonsful of sulphuric acid, and stirring the ingredients with a stick in a gallipot until the gas is evolved.

On a larger scale, it is prepared, according to Messrs. Swindell and Nicholson's patent, by passing oxygen gas through chloride of manganese, or iron, at a red heat. The products are peroxides of the metals and chlorine gas. Solutions of chlorine gas should be kept in black bottles, well stoppered, as they are partly decomposed by the action of light, and a quantity of hydrochloric acid is formed. "Phosphorus and several of the metals, as antimony, copper, zinc, arsenic, iron, gold, silver, when reduced to very thin leaves, and introduced into this gas, take fire spontaneously, and some of them burn with considerable splendour. The product of the combustion is named a chloride."

The following are the compounds of chlorine with oxygen, according to Dr. Thomson :—

	Chlorine.	Oxygen.	
Protoxide of chlorine .	36	8	= 44
Peroxide „ . .	36	32	= 68
Chloric acid . . .	36	40	= 76
Perchloric acid . .	36	56	= 92

Of these, the two latter only are employed in the arts.

Chloric acid (symbol ClO^4), is an aqueous compound, which becomes of an oily consistence by concentration. It is colourless, tastes acid, and smells pungent. By heat, perchloric acid is produced (symbol ClO^7), in company with free chlorine and oxygen. The peracid, condensed in a receiver, constitutes a colourless fluid. Chloric acid is thus prepared by Professor Bottger :—A solution of chlorate of soda is first prepared by decomposing bitartrate of soda with chlorate of potassa in this manner : 7 parts by weight of crystallised carbonate of soda, and 7½ parts of tartaric acid are dissolved in 24 parts of boiling water; and to this boiling solution is added another solution of 6 parts by weight of chlorate of potassa in 16 parts of water, also boiling—the mixture being well agitated. As soon as this is done, the whole is taken from the fire and allowed to cool, in order that the bitartrate of potassa formed may be properly separated. Then pour the mixture on a double paper filter, and add to the filtered liquid a saturated solution of oxalic acid, consisting of 6 parts by weight of the acid and 18 parts of water, heated to not above 134° F. The whole is then to be well agitated, and the vessel placed in an ordinary refrigerating mixture. The oxalate of soda may then be entirely and easily removed by a simple filtration. To obtain a chymically pure and more concentrated acid, the solution above obtained should be heated with recently precipitated carbonate of barytes, avoiding any rise of temperature; but the solution of barytic salt may afterwards be evaporated over the fire, and the large beautiful crystals which soon form should be pulverised, dissolved in a little water, and decomposed with a corresponding quantity of sulphuric acid.

(To be continued.)

Architectural Glossary.

ABACISCUS (a diminutive of Abacus). The square compartments of mosaic pavements.—*Webster.*

ABACUS (from the Hebrew *abak*, dust; a flat board covered with dust, having been used by the ancients for making calculations on). The uppermost member of a column, crowning the capital. "Abacus means the same thing, but is opposed in application to plinth" [which see].—*Ency. Brit.* "It is otherwise defined by some as a square table, list, or plinth, in the upper part of the capitals of columns, especially of those of the Corinthian order, serving instead of a drip or corona to the capital, and supporting the nether face of the architrave and the whole trabeation. In the Tuscan, Doric, and ancient Ionic orders, it is a flat square member, well enough resembling the original title, whence it is called by the French *tailloir*, that is, a trencher. In the richer orders it parts with its original form, the four sides or faces of it being arched or cut inwards, and ornamented in the middle of each face with a rose or other flower, a fish's tail, &c.; and in the Corinthian and Composite orders, it is composed of an ovolo, a fillet, and a cavetto. The word is used by Scamozzi to signify a concave moulding in the capital of the Tuscan pedestal."—*Gwilt.* "The term is derived from Vitruvius, who applies it only to the thin *tabular* abaci of the Ionic and Corinthian capitals, and employs the more appropriate word, *plinth*, for the tile-like abacus of the Doric. Vitruvius, therefore, uses these words descriptively; but the modern writers on architecture employ *abacus* technically for this member without regard to its proportions."—*Glossary of Architecture.*

ABUTMENT (Fr. *aboutir*, to touch at the end). The solid wall from which an arch immediately springs.

ACANTHUS (from the Greek *acantha*, a prickle or thorn). The ornament of the Corinthian and Composite capitals (see vol. i. p. 2). The order acanthaceæ "are almost entirely tropical herbs or shrubs. Some of the species are very shewy, but few of them are cultivated commonly; a large proportion are mere weeds. The acanthus mollis, the foliage of which gave rise to the classical acanthus of architecture, is one of the most interesting of hardy herbaceous plants."—*Loudon Ency. of Plants.* "Acanthads are almost entirely tropical, and in such regions exceedingly common, constituting, in fact, a large part of the weedy herbage. It is only in some rare instances that they advance far to the north, as in the genus acanthus found in Greece, and in a few species inhabiting the United States."—*Lindley's Vegetable Kingdom.*

ACHELOR. See ASHLER.

(*To be continued.*)

Technicologia.

116. *To Colour Jewellery.*—The colouring, as it is called, of jewellery, is effected by externally dissolving out the copper with which it is alloyed, and thereby exposing a superficial facing of fine gold. To produce this effect, the object to be coloured is first heated nearly to redness in a gas jet or spirit lamp, and then plunged into a weak solution of nitric acid, by which the copper on its surface is removed. The same effect is also produced by placing for a few minutes the object to be coloured in a paste composed of a mixture of alum, common salt, and saltpetre. In this case, the chlorine evolved from the mixture dissolves out the copper, and leaves the object with a surface which is readily brightened by polishing, and when finished presents all the depth of colour possessed by pure gold.

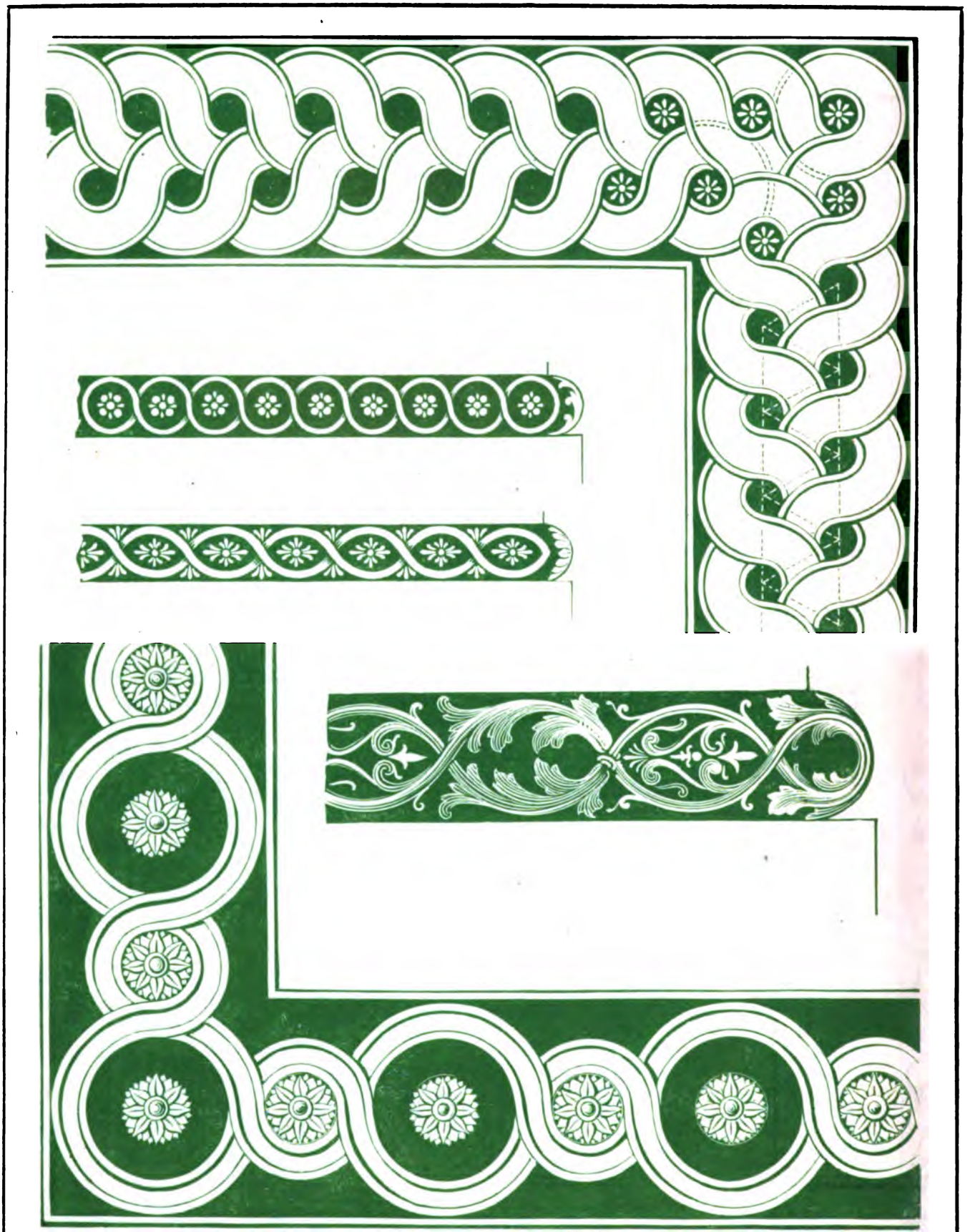
117. *Desachy's Patent Mouldings.*—The mould from which a cast is required is to be prepared in the ordinary way; and on the inner surface lay a very thin coat of the plastic material to be employed. Whilst in the fluid state, small strips of canvas or other fibrous material are to be applied and pressed on the surface of the mould with a brush, taking care to leave as small as possible a quantity of the fluid plaster, or other plastic material next the surface of the mould. Where additional strength is required, the operation may be again repeated by other strips of canvas, crossing the first, and applied in the same way. Casts taken in this way will weigh much lighter than plaster casts, and their durability is greater, not being so liable to fracture.

118. *Lawley's Patent for Tin Plate Ornamentation.*—On the tin surface the parts of a design which are to remain bright are stopped out, and the uncovered part is engraved on or roughened. By these means, varied ornamental effects, of a mixed bright and dead character, may be produced.

119. *Water-colours for Prints.*—Prints, if the paper be pure white, require no colour, unless in the shaded parts; and then in painting of flowers, if they tend towards a reddish colour, use a faint colour of carmine with gum-water, upon the shades only; if blueish, use a little faint indigo in gum-water slightly passed over the shades, easily touching upon the lights. Where there is a yellow tinge, either use a faint tincture of gamboge or of French berries; or if the whites have a purplish cast, use a thin lake on the shady side, suffering the colour only to shine a little into the light, which will give a lustre to the whites; and if a greenish cast should be there, use a very faint colour of the sap-green, or in proportion of the sap-green mixed with the verdigris-green.

LIGHT, SHADE, AND CHIAROSCURO.

Although the distinction between "light and shade" and "light and dark" may at first sight appear a slight one, it is, notwithstanding, a real and useful one: light and dark being the two abstract terms, the one active and positive, the other passive and negative; but neither of which, at their abstract maximum, are incidental to our system; our light and shade being offsets and modifications only of their abstract principles, which, though they exist, never reach us in their primitive force. Thus, one colour—say blue—is darker than another—say red, and darker still than yellow; but it would be improper to say that blue is shadier than yellow, or black more shady than white, though both one and the other are darker. Now, though—for want of a secondary term for light, to answer the same purpose that shade does for dark—we cannot say that one part of a picture may be light without being *light*, yet another part of a picture may be readily understood to be dark, without being *shade*. This light and shade, in which is involved the whole of drawing and form, added to that light and dark, which is thus latent in colour, constitutes the whole range of material for producing expression, from the simple to the terrible, that is discoverable by the visual organ throughout nature, or indeed that visible nature can convey to our perceptions. The first of these (light and shade) is coincident, and it may be said, coeval with form, and, pictorially speaking, cannot be separated from it; the only difference being, that in nature light and shade is the result of, and uncontrolled by, form; and in Art form is the result of, and is controlled by, light and shade. This part of the art is as much a matter of easy mechanism as drawing; that is, that part of drawing which is the merely correctly circumscribing a certain form from a given distance with a line, all higher drawing than this being invention, as is light and dark, as contradistinct from light and shade; and the properties of each of which may be carried so far, and arrive at so high a pitch of excellence, as to only find appropriate admission to the sublimest heights of fine art. For the sake of a more easy distinction, the term, chiaroscuro, may be used in the sense of light and dark, and not light and shade. A lecturer and writer upon Art, of great popularity, says, "Colour and light and shadow, can do little but express a mysterious sentiment." If by this it be meant to deny to two powers out of but three their intrinsic and just importance, it is an extraordinary mistake to say the least. If it be intended to induce amongst the rising painters a disregard of them as separate subjects of study, it is mischievous, and dangerous to all who may be inclined to hinge their faith and practice rather upon one alone than a number of masters. The acknowledgment that to light and shade belongs a "mysterious sentiment," is something; but it is intended to challenge for them something beyond mere mystery; and it is hoped that their claims to a definite character may be made apparent, to some degree at least, even within the circumscribed limits of an essay. That mystery and doubt belong to darkness by itself, must be acknowledged; but that mind must of itself be darkness, mystery, and doubt, if it may not be added error, which can attribute to light the same character which distinguishes its sombre antagonist, or limit to "light and shadow," in combination, the power only of expressing little more than a mysterious sentiment. Leaving colour out of the question, light and shadow, and chiaroscuro, are capable of expressing, and really do express, all that external nature is capable of conveying to the painter, or the painter can convey to the spectator. If nature could "do little but express a mysterious sentiment," then would it not be contended that "light and shadow and colour" could do more. Nature, on the contrary, does express infinitely more than can ever by possibility be imitated by the painter; yet all that can be achieved in such an imitation falls within the province of "light and shadow and colour," to express. Drawing being nothing more (in an accomplished work, or in nature) than an imaginary boundary to form, already consummated by light and shade; and in the hands of an accomplished painter, nothing more than a technical means to an end, in the carrying out of which should be involved its entire suppression.



GUILLOCHES

PANEL.

Oil Painting.

WE are generally told that the origin of painting in oil was owing to the Van Eyck, or early Flemish school, Antonella da Messina, who studied under Van Eyck, having first introduced it into Italy; but recent critical writers have awarded the honour of the invention to the Greeks, while others, proceeding still farther, have stated that the Egyptians were probably acquainted with the advantage of oil as a vehicle for pigments—referring for their authority to stone sculpture figures in the British Museum, which are painted with an unctuous vehicle appearing to be oil.

Many of the ancient medical writers seem to have been acquainted with the peculiar properties of walnut, linseed, poppy, and other oils, while Galen mentions the drying properties of linseed and hempseed—and on nut oil is more decisive; and Pliny observes that all resins may be dissolved in oil. Ætius, who wrote at the end of the fifth and the beginning of the sixth century, mentions a drying oil in reference to works of art. The passage is curious, and is as follows:—"The medicinal uses of walnut oil are the same with linseed and other oils; but it has a use beside these, being employed by gilders and encaustic painters; for it dries and preserves gildings and encaustic paintings for a long time;" but with all these we do not find oil mentioned as being applied to paintings; and Sir Charles Eastlake remarks that it was only used at this early period as a preservative varnish for the gilded articles, and not as a mordant for the application of the gilt. Cennini, however, speaks of the application of oils combined with other ingredients as mordants for gilding—but later writers only speak of glutinous mordants. It is therefore clear, says Sir Charles Eastlake, that an oil varnish composed of inspissated nut oil, or of nut oil combined with a dissolved resin, was employed on gilt surfaces and pictures with a view to preserve them at least as early as the fifth century. It may be added, that a writer who could then state, as if from his own experience, that such varnishes had the effect of preserving works for a long time, can hardly be understood to speak of a new invention. Leonardo da Vinci, writing a thousand years after Ætius, recommends as a varnish nut oil thickened in the sun. The Lucca manuscript, published by Muratori—placed by Mabillon in the time of Charlemagne—describes a varnish composed of linseed oil (lineleon) and a needless variety of resins, with which gums even appear to be intermixed, while nut oil is nowhere mentioned in it. The age of Charlemagne was an era in the arts; and the addition of linseed oil to the materials of the varnisher and decorator may thus, on the above evidence, be assigned to it.

Between the tenth and twelfth centuries Eraclius or Heraclius, is supposed to have written his treatise "De Artibus Romanorum." Mr. Hendric observes of him—"The art of Eraclius is the school of Pliny, increased, it is true, by Byzantine invention, but yet essentially Roman." And again,—"The treatise of Eraclius likewise proves the existence of the art of mixing colours with oil, and of the preparation of canvasses, skins, or panels, with colours ground in linseed oil for the purpose of paintings which were afterwards to be executed in colours ground in the same oil."

Linseed oil varnish composed of simpler materials—as sandarac and mastic resin boiled in the oil—is found to have been used for some time after this in all known recipes. An unsuccessful attempt was made in the fourteenth century to introduce nut oil. That vehicle, so long discarded, was attempted to be restored by the Van Eycks at the commencement of the fifteenth.

"Thenceforward the (nut or linseed) oil varnish, as distinguished again from varnishes composed of resins dissolved in essential oils, still continued to be exclusively used till the close of the fifteenth or beginning of the sixteenth century; when the Italians, who had already adopted a different system from the first improvers of oil painting, began to employ essential oil of varnish."

The foregoing authors form the connecting links of a history which brings us down to the time of the earliest known authority in modern Italian Art, Cennino Cennini. He received from his master, Agnolo Gaddi, the scholar of Giotto, such traditions of processes or methods, as Cimabue himself had adopted from the Greek practice. That the men in Cennini's time availed themselves of such information as the early writers abound with, is shewn by Vasari's account of Antonio Venziano, a fellow-pupil of Cennini—who quitted painting for medicine, in consequence of having studied Dioscorides. All these notices, then, go to shew that the Van Eycks were not the inventors of the art of oil painting. Cennino Cennini, the first to treat of modes of manipulation, tells us how to paint in oil on walls, on panels, on iron, or on any other surface—how to prepare walls for painting in oil—how to prepare an oil fit for tempering colours, and also fit for mordants, by boiling it over the fire—again, how to prepare good and perfect oil by baking it in the sun, and how to grind colours in oil. Such statements do not, however, shew that this material was applied to the painting of the human form. Oil incorporated with varnish is seen to be in Cennini's time applied as a coating to protect gilding, and to be employed as a varnish for tempera pictures, while it was used in draperies and ornamented portions of the work. The flesh always appears dry and flat—the consequence of the tempera; and the inspissated or thickened oil makes the surface of either draperies or ornaments of such early pictures seem embossed. This varnish, "vernice liquida," not particularly described by Cennini, was composed, according to Sir Charles Eastlake, of amber or sandarac and linseed oil, with and without concrete turpentine, *pece Greca*. In England, in the thirteenth and fourteenth centuries, the notices in the account-rolls are numerous, of the employment of oils and varnishes. That the great improvement in oil-painting (ultimately leading to its general use) was first made in Flanders, is naturally accounted for, "by the necessity of counteracting the effects of a humid atmosphere on painted surface by hydrofuge or oleoresinous preparations." That the Van Eycks carried the process of oil-painting further, in point of delicacy and refinement, than had been previously done, may be inferred from a reference to the picture by one of these artists in our own National Gallery, compared with such specimens of anterior times as exist here or abroad. The Strasbourg MS. of the fifteenth century, but recording practice of an earlier date, must not be forgotten amongst the documents tending to shew the early use of oil; but the mention of its employment—in the different public buildings at Westminster as well as in Italy—is so constant that attempt at further enumeration here would be mere prolixity. Horace Walpole, the Rev. Mr. Bentham, Mr. Smith Raspe, and others, have all shewn that painting in oil was practised in England from a very early time up to the fifteenth century.

Forms.

The following observations on the quality and relation of forms in Art are extracted from Mr. James Fergusson's "Illustrated Handbook of Architecture." They will repay study and application.

"It is extremely difficult to lay down any general rules as to the forms best adapted to architectural purposes, as the value of a form in architecture depends wholly on the position in which it is placed and the use to which it is applied; and there is in consequence no prescribed form, however ugly it may appear at present, that may not one day be found to be the very best for a given purpose, and in like manner none of those most admired which may not become absolutely offensive when used in a manner for which it is unsuited. In itself, no simple form seems to have any inherent value of its own, and it is only by their combination one with another that they become effective. If, for instance, we take a series of twenty or thirty figures, placing a cube at one end as the most solid of angular, and a sphere at the other as the most perfect of round shapes, it would be easy to cut off the angles of the cube in successive gradations, till it became a polygon of so many sides as to be nearly curvilinear. On the other hand, by modifying the sphere through all the gradations of conic sections, it might meet the other series in the centre without there being any abrupt distinction between them. Such a series might be compared to the notes of a piano. We cannot say that any of the bass or treble notes is in itself more beautiful than the others. It is only by a combination of several notes that harmony is produced, and gentle or brilliant melodies by their fading into one another or by strongly marked contrasts. So it is with forms: the square and angular are expressive of strength and power; curves, of softness and elegance; and beauty is produced by effective combination of the right-lined with the curvilinear. It is always thus in nature. Rocks and all the harder substances are rough and angular, and marked by strong contrasts and deep lines. Even among trees, the oak is rugged, and its branches are at right angles to its stem or to one another. The lines of the willow are rounded and flowing. The forms of children and women are round and full and free from violent contrasts; those of men are abrupt, hard, and angular, in proportion to the vigour and strength of their frame.

"In consequence of these properties, as a general rule, the square parts ought always to be placed below, where strength is wanted, and the rounded above. If, for instance, a tower is to be built, the lower storey should not only be square, but should be marked by buttresses or other strong lines, and the masonry rusticated, so as to convey even a greater appearance of strength. Above this, if the square form is still retained, it may be with more elegance and less accentuation. The form may then change to an octagon, that to a polygon of sixteen sides, and then be surmounted by a circular form of any sort. These conditions are not absolute, but the reverse arrangement would be manifestly absurd. A tower with a circular base and a square upper storey is what almost no art could render tolerable, while the other pleases by its innate fitness without any extraordinary effort of design.

"On the other hand, round pillars are more pleasing as supports for a square architrave, not so much from any inherent fitness for the purpose as from the effect of contrast, and flat friezes preferable to curved ones of the late Roman styles from the same cause. The angular mouldings introduced among the circular shafts of a Gothic coupled pillar add immensely to the brilliancy of effect. Where everything is square and rugged, as in a Druidical trilithon, the effect may be sublime, but it cannot be elegant; where everything is rounded, as in the choragic monument of Lysicrates, the perfection of elegance may be obtained, but never sublimity. Perfection, as usual, lies between these extremes."

Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

By FRANCIS BENJAMIN THOMPSON.

CHAPTER V. (*continued*). — INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Chlorine (concluded).—But the most important and best known compound of chlorine is that which it forms with hydrogen in the production of hydrochloric acid, commonly termed muriatic acid, or spirit of salt. This acid is symbolised HCl and its equivalent number is 37; its specific gravity is 1·28. In this state it is a transparent, colourless, acrid gas; but combined with water, it becomes the well-known liquid used in the arts, containing oxygen as well as hydrogen. It bleaches vegetable colours, oxydises all metals, and acts as a solvent for gold and platina. When the acid forms a compound with any metal the product is termed a chlorate of the oxide of the metal.

Hydrochloric acid is most extensively prepared from common salt, the principal ingredient of which is a natural chloride of sodium. Diluted sulphuric acid is thrown upon this substance; the acid combines with the sodium, forming sulphate of soda, while the hydrochloric acid gas liberated flows into a receiver, where it is condensed.

Nitro-muriatic acid, or aqua regia, is a common solvent for gold and platinum, and its proportions are variable, according to the purpose for which it is required. It is generally best when made fresh.

An extemporaneous bleaching liquid may be made, according to Francis, by putting a little chlorate of potassa into twice or three times the quantity of common salt, and diluting it with water.

Carbon (symbol C, equivalent 6·019).—The specific gravity of carbon in the highest state of purity in which it is known to exist, that of the diamond, is from 3·4 to 3·6. This is common charcoal—the end of all matter and perfectly indestructible. It is obtained as pure as possible by applying intense heat to wood in vacuo, and it may be treated so over and over again without alteration. In atmospheric air, oxygen gas, &c., it burns readily. It can assume another character, however, that of the rarest and dearest of all gems—the diamond.

Sir David Brewster refers the origin of the diamond to a slow decomposition of plants. He saw a diamond which contained a globule of air, whilst its surrounding substance had a polarising structure, displayed by four sectors of polarised light encircling the globule. He therefore inferred that this air-bubble had been heated, and, by expansion, had produced pressure on the surrounding parts of the diamond, and thereby communicated to them a polarising structure. Now, for this to have happened, the diamond must have been soft and susceptible of compression; but as various circumstances contribute to prove that this softness was the effect of neither solvents nor heat, he concluded that the diamond must have been formed, like amber, by the consolidation of vegetable matter, which gradually acquired a crystal form by the influence of time and slow action of corpuscular forces. *(To be continued.)*

Heraldic Blazon.

(*Continued from page 26.*)

Furs are used in heraldry in place of metals and tinctures. They are as follow :—

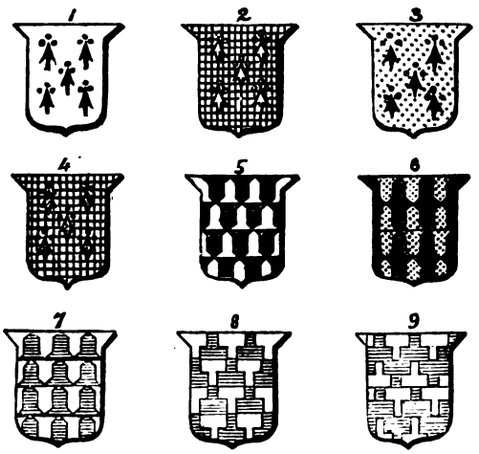
Ermine (fig. 1), field argent, spots sable.

Ermines (fig. 2), the above reversed.

Erminois (fig. 3), field or, spots sable.

Pean (fig. 4), the above reversed.

Vair (fig. 5). Composed originally of pieces of fur sewed together; but now always formed of pieces argent and azure, the former being cut or painted so as to resemble the flower of the campanula, and opposed to each other in rows.



Vairé. When the escutcheons in fig. 5 are of various tinctures the field is called vairé.

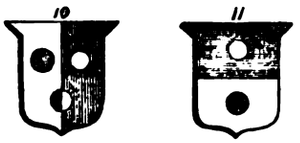
Menu vair, or little vair, consists of more than four rows of escutcheons on the field.

Counter vair (fig. 6), has the escutcheons arranged base against base and point against point.

Vair en pointe (fig. 7).

Potent and counter potent (figs. 8 and 9). This resembles the heads of crutches, called potents by Chaucer.

Counter changed is a division of the field by any line of partition (figs. 9 and 10), so that each division has an opposite character.



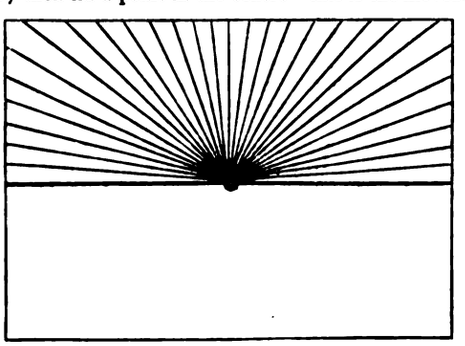
It is an invariable rule of heraldry that metal shall never be placed upon metal or colour upon colour; that is, if the field be of colour the immediate charge must be metal, and vice versâ.

(To be continued.)

Technicologia.

120. *Whites for Painting Miniatures.*—Flake-white is better than white lead ground, and, if it be pure, far exceeds it in beauty, because the white lead is apt to turn black, especially if it be used with a hard water. Some recommend a white made of pearl and oyster-shells, reduced to an impalpable powder; this is by some called pearl-white, and will mix well with any colour. But if you use white lead, first rectify it with white-wine vinegar, which causing a fermentation, the white will soon settle; after which pour off the vinegar, and wash the white with common water. The method of washing it is thus :—Put the powder into a glass of water, stir it about, and presently pour off the water, while it is white, into some other clean glass or vessel; then letting it settle, pour off the water from it, and you will have an excellent white, to which, when it is settled, you are to put as much gum-water as it is necessary to give it a glaze. White lead will turn black if mixed with water that comes from iron or clay, in a month or two, and if it be mixed with any other colour, it will soon change or alter it. Some recommend the powder of egg-shells of the brightest colour, and well cleaned and washed, as very good to be ground with gum water; or you may put a twentieth part of clean white sugar-candy to grind with it in water; it must be ground to an impalpable powder. If rectified spirits of wine be poured on it, it will clear it from dross. Egg-shell powder is of very great service as a white in water-colours, and itself and the oyster-shell powders, well rectified and mixed with the white of an egg well beaten, will make an extraordinary mixture in other colours, and will prevent them from changing or altering their qualities. A fine white for water-colours is made by dissolving filings of fine silver or silver-leaf in aqua-fortis; then evaporating the aqua-fortis till it looks like crystals in the bottom of the glass; decant the other part of the aqua-fortis, and wash the silver five or six times in common water, till it is freed from the aqua-fortis, which may be known by tasting it, then dry it for use. It must be used with gum-water and a little water of sugar-candy. A fine white lead colour is made by grinding choice white lead well upon a porphyry slab with vinegar, so that it turns blackish; then take a potful of water, and washing the white lead in it very well, let it settle, and, pouring off the water, grind it again with vinegar; repeat this once or twice more, and an excellent white both for water-colours and painting in oil will be produced.

121. *Scale for the Vanishing Lines of Perspective.*—Take a sheet of paper and rule it with very black ink from one side to the other—this represents the horizontal line; then fix a point in the centre—this is the moveable



point of sight; afterwards cross it with as many diagonal lines as you please. This instrument will be a sure guide to an inexperienced hand in taking the perspective lines of all objects placed at right angles, by placing it under the paper on which the drawing is to be made, only the latter paper must be thin enough to discern the lines through it.

122. *Simultaneous Gilding and Plating by Electricity.*—An object may be silvered in some parts and gilded in others, by a very simple expedient. Let the parts intended to be gilded, be coated with some non-conducting substance, not affected by the solution of silver, and let the object be then immersed in the solution and put in connection with the galvanic battery; the parts not coated will then be plated; let the parts thus plated be now coated with a non-conducting substance, not affected by the solution of gold, the coating previously applied being removed, and let the object be immersed in the solution of gold, and being connected with the battery, the parts not coated will be gilded.

123. *To Temper Steel.*—Pure lead is ignited to a moderate redness, and well stirred; into this the steel is plunged for a few seconds, quickly stirred about in the bath, suddenly drawn out, and plunged into a large quantity of water. In this manner a plate of steel may be hardened so as to be perfectly brittle, and yet continue so sound as to ring like a bell.

124. *Shell Lac.*—This resin may be obtained pure by treating it with cold alcohol, and filtering the solution in order to separate a yellow gray pulverulent matter. When the alcohol is again distilled off, a brown, translucent, hard, and brittle resin remains. It melts into a viscid mass by heat, and diffuses an aromatic odour. Pure alcohol dissolves it in all proportions. Shell-lac dissolves with ease in diluted hydrochloric and acetic acids; but concentrated sulphuric acid is not a solvent. The resin of shell-lac has a great tendency to combine with salifiable bases, as with caustic potassa, which it deprives of its alkaline taste. This solution, which is of a dark red colour, dries into a brilliant transparent reddish brown mass, which may be redissolved in both water and alcohol. By passing chlorine in excess through the dark-coloured alkaline solution, the lac resin is precipitated in a colourless state. When this precipitate is washed and dried, it forms, with alcohol, an excellent pale-yellow varnish, especially with the addition of a little turpentine and mastic. With the aid of heat, shell-lac dissolves readily in a solution of borax.

125. *Gamboge.*—When a solution is made of this gum for the purpose of painting, &c., it should be used the same day, as after a longer time a considerable portion is converted into oil.

ARTISTS' COLOURMEN.

It was of advantage to the old school of Italian painters that they were under the necessity of making most of their colours themselves, or, at least, under the inspection of such as possessed chymical knowledge, which excluded all possibility of those adulterations to which the moderns are exposed. The same was also the case in England till the time of Sir Godfrey Kneller, who, when he came to this country, brought over a servant with him, whose sole employment was to prepare all his colours and materials for his work. Kneller afterwards set him up as a colour-maker for artists; and this man's success, he being the first that kept a colour shop in London, occasioned the practice of it as a trade."—*Northcote.*

Architectural Glossary.

(*Continued from page 27.*)

ACROLITHI (Gr. *akrolithoi*). Statues of which the extremities (face, feet, and hands, or toes and fingers) only were of marble, and the remaining parts of the body of wood, either gilt or, what seems to have been more usual, covered with drapery.—*Smith's Dict. of Gr. and Rom. Antiq.*

ACROTER, ACROTERIUM (Gr. *acroter*, a summit). Dr. Johnson defines acroteria to be "little pedestals without bases, placed at the middle and the two extremes of pediments, sometimes serving to support statues." The name, according to Gwilt, has also been "applied to the ridge of a building; small pieces of wall in balustrades, between the pedestal and the balusters, and again to the pinnacles or other ornaments which stand in ranges on the horizontal copings or parapets of buildings." The "Encyclopædia Britannica" defines the acroterium to be "a statue or ornament of any kind placed on the apex of a pediment. The term," it continues, "is often incorrectly restricted to the plinth, which forms the podium merely for the acroterium. The statue of the saint on the apex of the pediment of the western front of St. Paul's, is an acroterium; the other statues may be called acroteral figures." Vitruvius says that the lateral acroteria ought to be half the height of the tympanum, and the apex acroterium should be an eighth part more. "No regular proportion, however," remarks Gwilt, "is observable in Greek buildings." The acroterium is "often similarly placed upon the summit of the gables in Gothic architecture, especially in canopy work; sometimes others spring from the sides of the gables, as in the tomb of Aymer de Valence, Westminster Abbey; they also cap the pinnacles of buttresses, as at the east end of Norwich Cathedral.

ADIT or ADITUS (Lat. *adeo*). The entrance or approach to a building.

ÆTIAIOI (Gr. *ætos*, an eagle). The slabs forming the face of the tympanum of a pediment, which is called ætoma or ætos.—*Gwilt.*

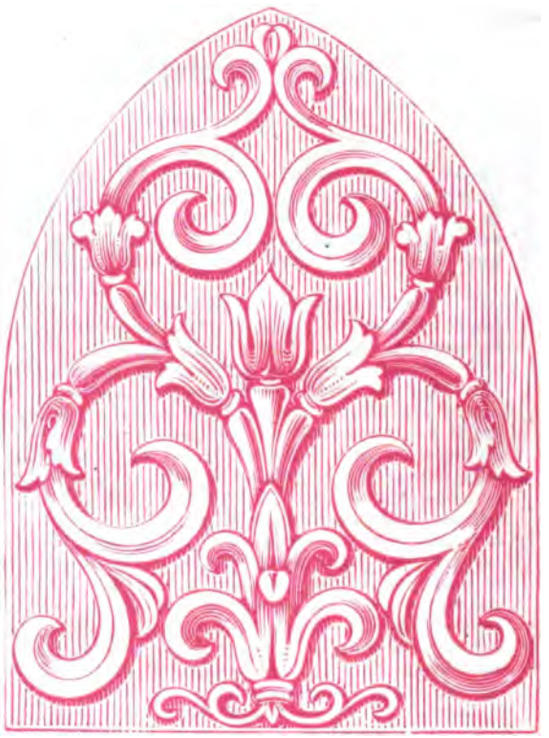
AISLE, AILE, or ALA (Lat. *ala*). Lexicographers have doubts about the propriety of this word. Todd commentating Johnson, who spells it aisle, says, "Thus the word is written by Addison, but perhaps improperly, since it seems deducible only from either *aile*, a wing, or *allée*, a path, and is, therefore, to be written *aile*." Dr. Webster derives the word from the French aile; and gives as its definition, "the side portions of a church, in distinction from the nave or centre." A second meaning is also given—"A walk or passage in a church."

ALCOVE (Arabian *alkobba*). "A recess or part of a chamber, separated by an estrade or partition, or by other corresponding ornaments, in which is placed a bed of state, and sometimes seats to entertain company."—*Trevoux.* "In England," says Gwilt, "the alcove is rarely introduced, but in France and Italy it often forms a beautiful feature of the apartments of palaces." Webster adds the following additional meanings:—"a recess in a library, or small lateral recess for books; a covered building or recess in a garden; a recess in a grove. Webster's second explanation most commonly applies to English usage.

ALKORANES (Arabian). Tall, slender towers belonging to mosques.

(*To be continued.*)

INITIALS.



ORNAMENTS (GREEK).

INITIALS.

Papier Mache.

NOTWITHSTANDING the name that has been given to the material, which would seem to imply that it is of French extraction, there is yet very good reason to believe that to England is to be attributed the merit of first applying this manufacture to important uses. Light and trivial articles, such as snuff-boxes, cups, &c., had, on the continent, been made of papier-maché for a long course of time; but, from a passage in an article "sur l'Art de Moulage," in the "Encyclopédie Méthodique," we may safely conjecture that here first it was applied to the builder's purposes. (See Vol. v.; Paris, 1788.) The particular circumstances that gave rise to the adoption of papier-maché by the architectural decorator in England, deserve the especial notice of all who are interested in the welfare of our manufactures.

It should be premised, that with the Elizabethan style, or the "renaissance," of England, enriched plaster ceilings were very generally brought into use; and in the more classic or Italian styles that followed, the same material was more extensively and more boldly employed. As the art advanced, plaster became partially substituted for carved or panelled wood wainscoting on walls; both in that situation and upon ceilings, foliage of the highest relief and of the richest character, may at the present day be found in the more important edifices remaining of the seventeenth and beginning of the eighteenth centuries: these enrichments were generally worked or rather modelled by the hand upon the stucco in its place, whilst still in a soft and plastic state.

As this work had to be done on the spot, and with much rapidity of execution, in order to prevent the stucco from setting before it had acquired the intended form, the art was somewhat difficult; the workman had to design almost as he worked: therefore, to do it well, it was necessary that he should have some of the acquirements and qualities of an artist. This circumstance, of course, tended very much to limit the number of workmen, and their pay became proportionably large.

It was no unnatural consequence that artisans thus circumstanced assumed a consequence that belonged not to their rank in life; it is said that they might have been seen coming to their work girt with swords, and having their wrists adorned with lace ruffles. Such a state of things was, as may be conceived, attended with many inconveniences to their employers; it was scarcely possible to preserve that subordination so essentially necessary in carrying on the business of a builder; and ultimately the workers in stucco, laying aside all restraint, combined together to extort from their employers a most inordinate rate of wages. It would be superfluous here to detail all the circumstances that followed; it is sufficient to state that, as might have been anticipated, the total ruin of their art was the final result of these delusive efforts to promote their individual interests.

Contrivances were resorted to by the masters, which soon supplanted the old mode of working in stucco. The art of moulding and casting in plaster, as previously practised in France, was generally introduced, and the art of preparing the pulp of paper became improved and extended, so as ultimately to render practicable the adoption of papier-maché in the formation of architectural decorations. Thus at last was extinguished the original mode of producing stucco ornaments; and there probably has not been for many years a single individual in England accustomed to that business.

The superior cheapness of the process of casting in plaster brought it into almost universal use; for, although in the course of the last century an immense trade was carried on in the manufacture of architectural and other ornaments in papier-maché, yet the poverty of taste they generally displayed, and the imperfection of machinery at that time, which prevented this material from coping with plaster in respect to price, ultimately caused its disuse. The manufacturers of papier-maché at that period do not seem to have been aware of the great improvements of which every process of their art proves now to have been susceptible.

A most mischievous effect, however, was produced in the art of decorative designing by this change in the mode of execution. All the deep undercuttings and bold shadows which marked the style of design in the age of Queen Anne became impracticable when ornaments were to be cast. A meagre, tame, *petite* manner ensued, almost of necessity, until by the end of the last century the art of designing architectural ornament had fallen into a deplorable state of imbecility.

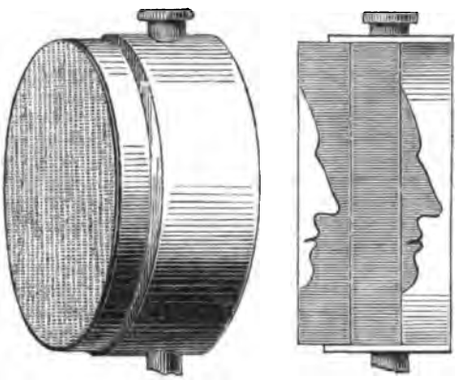
The subsequent introduction of Greek ornament formed a new era: the limited capabilities of plaster-casting became then less inconvenient, for the broad, flat character of the Greek style was favourable to the process of casting, and had that manner of designing continued to prevail generally up to the present day, it is probable that no material change would have taken place in the manufacture of ornament. But great fluctuations have occurred in the public taste: the pure and elegant simplicity of Greek ornament is in its nature appreciable only by the more highly cultivated tastes; the generality of persons do not understand its merits; therefore, after the stimulus of novelty had ceased to operate, fashion soon led the public favour into other channels. The bold originality of the Gothic school, the gorgeous and meretricious richness of the Flemish and French schools, the picturesque and fantastic forms of the Elizabethan style, soon found many admirers, and it is this great change in the manner of designing ornament that has given rise to the important improvements in the manufacture of the highly plastic substance called papier-maché. Plaster is totally inapplicable to the exact imitation of the bold florid carvings in the above-named styles, whilst to carve in wood all these fanciful forms would occasion a cost far beyond the means of all ordinary purses. As to the putty composition, a material introduced at the latter end of the last century as a substitute for wood carving in picture frames, &c., its monstrous weight, its brittle, impracticable nature, and the difficulties and heavy expenses necessarily incurred in its manufacture, as well as in fixing it up, render it properly applicable to a very limited range of purposes.

GENIUS.

There is no creature subject to the frailties of human nature so desirous of being looked upon as a man of genius as an artist. This is not extraordinary, since without genius, considered as an intellectual being, he is usually the most contemptible of his kind; his ignorance, which is proverbial, being now only equalled by his uselessness.

Technicologia.

126. *The Physiognotype.*—This is an instrument by which plaster casts of faces may be taken without submitting to the usual unpleasant process. It consists of an assemblage of very fine moveable wires, confined closely together within a broad hoop or band, after the manner of the bristles in a telescope hearth-brush, but not closed at the back, in order to allow the wires a free passage. The wires slide in a metal plate, perforated all over with



holes, very fine and close together. The apparatus is surrounded by an outer case which is filled with warm water, in order to prevent any unpleasant sensation on the contact of the instrument with the skin. When it is desired to take a likeness, the instrument is applied to the face with a gentle and gradual pressure, the wires easily yield and slide back, conformably to the prominences of the countenance; they are then fixed tightly in their position, and thus form a mould which will yield a perfect and faithful cast of the face, in which even the most minute line will appear with the strictest accuracy.

127. *German Silver.*—1. Common:—

	Parts.
Copper	8
Nickel	2
Zinc	3½
	13½

This compound forms the commonest that can be made with any regard to the quality of the article produced. It might do for wire for common purposes. If the quantity of the nickel be reduced much below this, the alloy will be little better than pale brass, and will tarnish quickly.—2. Good:—

	Parts.
Copper	8
Nickel	3
Zinc	3½
	14½

This is a very beautiful compound. It has the appearance of silver a little below standard; by some persons it is even preferred to the more expensive compound. We strongly recommend manufacturers not to use a metal inferior to this.—*From a Pamphlet by Messrs. Topping.*

Italian Majolica.

Towards the middle of the fifteenth century, under the auspices of Sforza, lord of Pesaro, Italy first produced enamelled earthenware vessels. They were first manufactured in imitation of those previously supplied from Majorca by the Spaniards, who, on recovering that island in 1230 from the Moors, became possessed of a knowledge of this branch of fictile art.

Italy bestowed upon its own enamelled earthenware vessels, the term Majolica (corrupted from Majorca), by which their Spanish prototypes had been previously designated, and this is indeed a more appropriate term than Faenza and Raffaële-ware, since these names can only properly refer to the works of a particular town, and the designs of a particular artist.

The earliest Italian examples with which we are acquainted were made at Pesaro in 1480. They principally consist of large dishes, clumsily formed, and enamelled only on one side, but remarkable for their lustrous tints of gold and ruby, which were carried to perfection by Giorgio Andreoli who worked at Gubbio from 1485 until 1537, and after his elevation to the rank of patrician signed his productions M°. G°. (Maestro Giorgio).

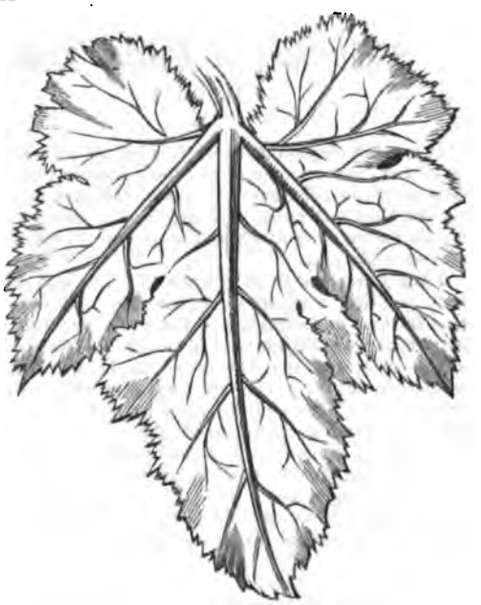
In 1486 certain privileges were granted to the potters of Pesaro, though an equal reputation was enjoyed by those of Gubbio, Castel-Durante, and Urbino.

At the last named place the lustrous tints already alluded to were employed by Francesco Xanto da Rovigo or Rovigdese until about 1538, when Guidobaldo II. succeeded to the Duchy of Urbino, and by fostering the potter's art gave a higher ambition to its professors. The brilliant tints and prismatic glaze, relics of Moorish taste, which had hitherto been the prevailing features of this ware, were now neglected in favour of artistic composition, in aid of which this prince collected original drawings by Raffaële Sanzio and his pupils, and engravings by Marc Antonio, besides employing Battista Franco, and Raffaële dal Colle to furnish designs for the manufacture, which, under his magnificent patronage, achieved its greatest glories and added to its resources the process of gilding on pottery.

From the death of Guidobaldo in 1574 the perfection of this ware declined, though it had survived the deaths of Orazzio Fontana, and Taddeo Zuccaro, and the defection of Raffaële dal Colle, three of its principal artists. It sunk into utter insignificance in the following century, which furnished only one artist, Alfonso Patanizzi, whose name is worthy of mention.

Tuscany does not appear ever to have been distinguished in this branch of art, notwithstanding that Flaminio Fontana, brother of Orazzio, was summoned to Florence by the grand duke. Naples, in adopting it towards the end of the 16th century, though she executed some highly finished works, never excelled in it; and Venice only made dishes which, though in many respects contemptible, are remarkable for their extreme lightness and peculiar sound on being struck, qualities which have caused them to be mistaken for thin sheets of metal embossed and enamelled.

HOP LEAF.



VEGETABLE MARROW LEAF.

Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

By FRANCIS BENJAMIN THOMPSON.

CHAPTER V. (*continued*). — INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Carbon (concluded).—Diamonds have been produced by the agency of heat and electricity on coke; but the expense and trouble is at present very great, and the size of the specimens by no means considerable. Factitious diamond making has been found a more profitable undertaking by the French. They have a secret composition, called *strass*, which equals the diamond in every respect except hardness.

There are four descriptions of charcoal known in the arts, namely, common wood charcoal, ivory or bone black or animal charcoal, coke, and lampblack.

Purified animal charcoal is prepared, according to the London Pharmacopœia, by digesting ivory black in diluted hydrochloric acid; then washing and drying. It is improved by heating to redness in a covered crucible.

Lampblack is formed from the smoke of oil lamps. A fine lampblack is obtained by the combustion of a thick torch of gas coal, supplied with a quantity of air adequate to burn only its hydrogen. In this case, the whole of its carbon is deposited in the form of a very black powder of extreme lightness. A most valuable species of black results from the combustion of gas, but it is necessarily very small in quantity.

There are only two compounds of carbon and oxygen, one, the carbonic oxide (symbol CO, equivalent 14); the other, carbonic acid (symbol CO^2, equivalent 22). Carbonic acid unites with an infinite variety of minerals and metals and imparts an almost exhaustless changeability of lustre and hue, as may be particularly observed in the carboniferous limestone family.

Carbonic acid gas is the choke damp of miners, and wherever atmospheric air has been exhausted by inspiration, its place is supplied by carbonic acid gas.

Carburetted hydrogen is our common illuminating gas, commonly prepared from coal in close retorts, and afterwards submitted to the purifying action of hydrate of lime. Its chief defect is the presence of sulphuretted hydrogen. This may readily be detected by exposing a piece of paper rubbed over with sugar of lead to the gas. It will be directly blackened by the sulphur. Sulphuretted hydrogen in common gas is often caused from the overworking in the purification of the alkali—lime—caused by the difficulty in getting rid of the latter.

Sulphur (symbol S, equivalent 16·086, specific gravity 1·99). Sulphur is principally derived from volcanic regions*; but it is also found largely intermixed with metals and minerals of various descriptions, such as iron pyrites, &c. It is a solid of a yellow colour, which changes on melting (at 300° F.) to an amber hue. It is insoluble in water, but soluble in oil of turpentine and other oils. Its vapour combines with that of alcohol, and both may be condensed. Flowers of sulphur are the small crystalline grains that result from its sublimation.

The compounds of sulphur with oxygen are—

	Sulphur.	Oxygen.	
Hyposulphurous acid (S^2O^2)	32	16	= 48
Sulphurous acid (SO^2)	16	16	= 32
Sulphuric acid (SO^3)	16	24	= 40

Of these, sulphuric acid is the most important combination. It is known under various designations—vitriol, elixir of vitriol, &c.

(To be continued.)

* It is thought that its abundance in those localities is due to the subterranean action of fire which has succeeded in expelling it from its combinations.

Adulteration of White Lead.

By M. Louyet.

It is really deplorable to see to what an extent certain chymical products are sophisticated; there is no knowing how far these villanous frauds, which injure our health no less than our purse, will go, for the pharmaceutical are sophisticated as much as the chymical products employed in the arts.

I lately received three samples of white lead, of different qualities, destined for exportation. It is probable that the distant destination of these products induced the manufacturer to believe that it was useless to keep within any bounds, and that the ignorance of the consumers would prevent them from knowing that what was given them for white lead might quite as well be called sulphate of baryta as carbonate of lead.

1 grm. of sample No. 1, heated to redness in a platinum crucible until completely converted into litharge, lost	0·100
A second calcination produced no further loss.	
1 grm. of sample No. 2 lost by similar treatment	0·049
1 grm. of No. 3 lost	0·037

The product of the calcination of No. 1 was boiled with pure nitric acid, the liquid diluted with water, and again boiled. There remained a yellowish residue, although the liquid was strongly acid; it was collected on a filter, and well washed with boiling water, dried and calcined; it weighed 0·305. I must not omit to observe that the residue yielded by the calcination of the white lead No. 1 was of a darker red than that yielded by No. 2, and this more so than the residue of No. 3, which was nearly white. The residue left by No. 1, after treatment with nitric acid, gave, on being heated with soda upon charcoal before the blowpipe, a fused residue, which, placed upon a bright piece of silver and then moistened, produced a permanent black stain. This character belongs to the sulphates. It was proved that the sulphate mixed with the carbonate of lead was sulphate of baryta. The solution obtained by digesting the white lead No. 1 with nitric acid was precipitated by sulphuric acid; the sulphate of lead, after having been heated to redness, weighed 0·765. This quantity of sulphate of lead contains 0·563 protoxide, which requires 0·111 carbonic acid to form the neutral carbonate, producing 0·674 carbonate. According to calculation from the oxide of lead found, I should have 0·111 carbonic acid; and by calcination, which converts the carbonate into oxide, I found only a loss of 0·100. This difference arises, it is true, from the whole of the oxide of lead not being in the state of carbonate; a small portion is in the state of hydrate; but as the equivalent of water is far less than that of carbonic acid, it follows that by calculating the whole of the oxide as combined with carbonic acid, I obtained too high a figure; it is therefore requisite to subtract 0·011 from 0·674, which leaves 0·663.

The white lead No. 2 was treated in the same manner; the portion not dissolved by nitric acid, washed, dried, and ignited, weighed 0·660. The sulphate of lead yielded by the nitric solution = 0·360, containing 0·264 protoxide of lead, which combined with 0·052 carbonic acid to form 0·316 carbonate. In this case the number calculated for the carbonic acid differs very little from that found. But in this instance, as in the preceding, the amount of carbonate of lead obtained is too low, and the loss must be referred to it. 1 gramme of No. 3 left a residue, on treatment of nitric acid, which weighed 0·718; it afforded 0·277 sulphate of lead, containing 0·203 protoxide, which combines with 0·040 carbonic acid, forming 0·243 carbonate of lead.

According to these analyses, the white leads have the following composition:—

1 grm. of No. 1 contains 0·695 white lead, and 0·305 sulphate of baryta.

1 grm. of No. 2 contains 0·340 white lead, and 0·660 sulphate of baryta.

1 grm. of No. 3 contains 0·282 white lead, and 0·718 sulphate of baryta.

It is not without reason, therefore, that I stated that these articles might as well be sold under the name of sulphate of baryta as under that of sulphate of lead.

Architectural Glossary.

(*Continued from page* 32.)

Altar-piece. The entire decorations of an altar.

Altar-screen, Altar-wall. The partition behind an altar.—*Gloss. of Arch.*

Altar-tomb. A raised monument resembling a solid altar.

Alto-Relievo. *See* Relievo.

Amphiprostyle (Gr. *amphi*, around or about, and *prostyle*, which see). A temple having a portico at each end.

Amphitheatre (Greek). A theatre in which people can stand and see from every part, generally referring to those having a circus in the centre.

Ampulla (Latin). A vase with a long neck, with a very small orifice, used as ornaments of buffets and tables.

Amulet. A figure or character to which are attached certain marvellous powers. The Egyptian buildings are covered with ornaments of this nature, and amongst almost every ancient people their use may be said to have been general. Much of the system of Greek and Roman ornament, and probably every other style of ornament, is but a refined employment of amuletic characters.—*Stuart's Dict. of Arch.*

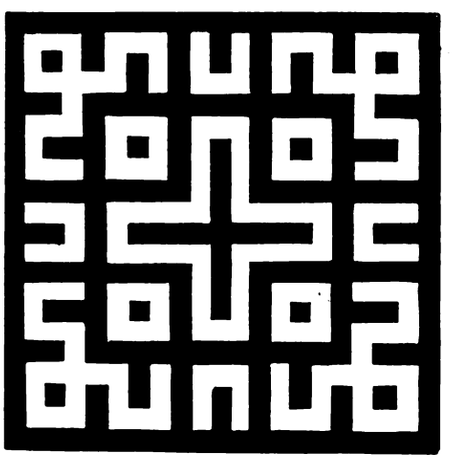
Anchor. In Greek and Roman architecture this is an ornament shaped like an anchor or arrow head. It is employed with the egg ornament to decorate mouldings. "It is used," says Gwilt, "in all the orders, but only applied to the moulding called the echinus, or quarter round." "Those representations of naval anchors which are seen on ancient monuments have nearly the same form as modern anchors, only the transverse piece of wood, or the stock, is wanting in all of them. They are generally two fluked."—*Stuart.*

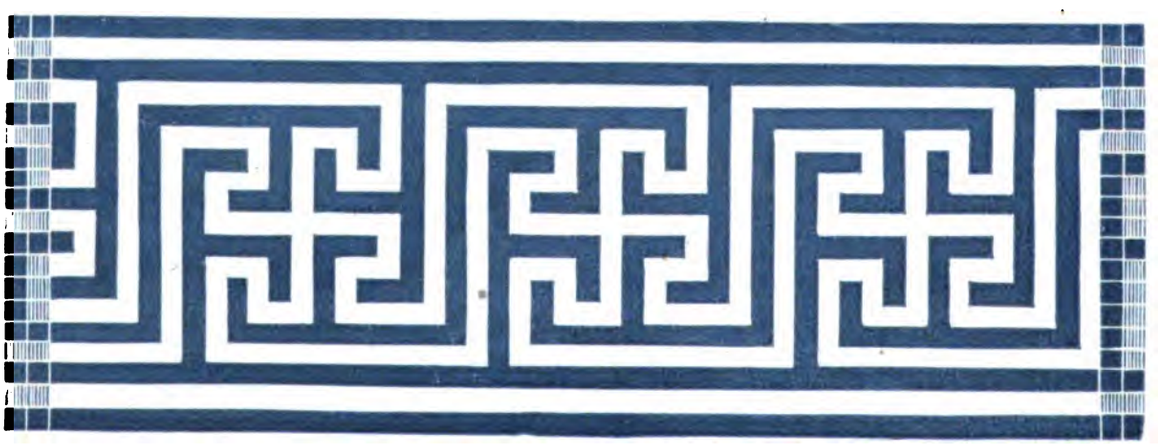
Ancones (Greek, *agkon*, the elbow joint). The brackets supporting the cornices of Ionic doorways, called also consoles and trusses. The term is also used to signify the corners or quoins of walls, cross beams, or rafters.

Angels. Brackets or corbels, with the figures or heads of angels.

Angle-Bar. In joinery, an upright bar at the angles of polygonal windows. A mullion.

(*To be continued.*)





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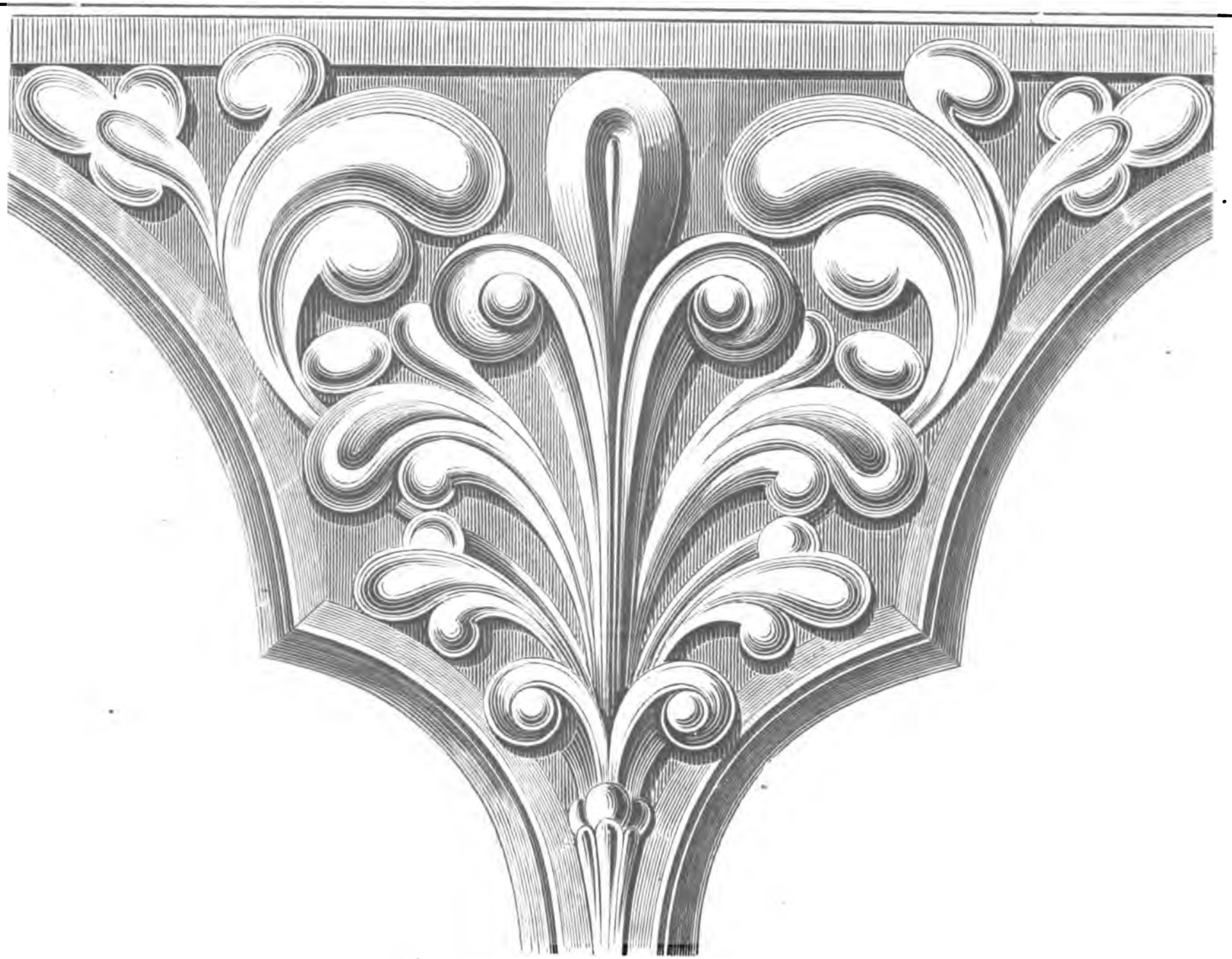


GOTHIC SPANDRIL (EARLY ENGLISH.

Chinese Architecture.

THAT land of mysteries and paradoxes, the Celestial Empire, presents us with many enigmas, the unravelment of which has baffled the ingenuity of the philosopher in every age. That a nation widely separated by religion, manners, government, and that most insuperable barrier, prejudice, from an extended intercourse with other countries—depending alone upon its own resources material and intellectual—should possess the elements, and in many cases the perfection, of arts and sciences that have required centuries of application in lands boasting a greater degree of civilisation, to invent and complete, is a surprising fact, for which it is utterly impossible to account upon any principle of ordinary judgment.

We have scarcely an invention of which we cannot trace a type, more or less rough, in use among this singular people—and, what is the more astonishing, referred by them to an origin so distant that our own chronology shrinks into Lilliputian dimensions when compared with it.

Remembering these circumstances, should it excite wonder to find the Chinese respectable, if not proficient, in the arts of painting, sculpture, and embellishment? True, their prejudices act as fetters, and their inconsistent religion as a thrall, upon their better judgment and natural talent, binding them to a monotonous course of action, and enslaving their minds with bigotry; yet they are ineffectual in wholly concealing the genius that peeps timidly through the productions of zeal and assiduity.

The Chinese columns are of wood in almost every case; but when they form the peristyle of any considerable building, they stand on stone or marble bases of various profiles. They are entirely without capitals, unless we consider as such the brackets projecting from the upper part of the shaft on opposite sides, and assisting to form the architrave. The height of the whole column is equal to from eight to twelve times its lower diameter, and the shaft is formed like the frustum of a cone. The base consists of a square plinth, above which is sometimes a moulding, in the form of an inverted cymatium, between two fillets; in other cases, the mouldings consist of the inverted cymatium and a torus, with a scotia and fillets between them; and occasionally there is placed immediately above the base a polygonal or cubical block, projecting beyond the surface of the shaft. The architrave is a cylindrical beam, like a pole, which passes through a hole bored near the top of each shaft, and is further supported by resting on two brackets, generally ornamented; which are inserted in the shaft below the architrave, and bent upward, so that the architrave may rest on the extremities. Above the architrave is sometimes placed what may be called a frieze, consisting of an open framework panelling, formed by circles or squares of wood intersecting each other, and the intervals between the panels are ornamented with bells and heads of animals. Over the frieze is the high and projecting cornice of a concave figure sloping downwards in front, and turned up at the angles; the points are ornamented with heads of fish or with dragons.

Ancient Roman Art.

Rome acquired her art through conquest; she imitated the buildings of countries subjected by her arms, and transported statues, pictures, and works of gold and silver, to adorn her capital. The produce of Athens, Delphi, and Elis, filled Rome with the rarest productions of the fine arts. The increasing power, when Julius Cæsar and Augustus held supreme sway, was auspicious to the general interests of Fine Art; the emperors made great efforts to increase the splendour and magnificence of Rome, and their policy extended a similar course throughout the empire, considering that it tended to fix authority, give general security, and contribute to the happiness of the people. This example was universally followed by their subjects, who had spirit to conceive and wealth to accomplish the noblest undertakings. The opulent senators of Rome and the provinces esteemed it an honour, and almost an obligation, to adorn the splendour of their age and country; the influence of fashion very frequently supplying the want of taste or generosity. It was within a period of 300 years that the luxurious adornment of Rome took place. The sculptors were universally Greeks, and though wealth and honour drew men of talent to Rome, and somewhat revived Greek excellence, the creative spirit, the spark of vitality, infusing life and soul, originality and thought into their productions, could not be recalled. In the best age of Roman art the demand was chiefly for statues of personal representation, in which a vitiated taste often required the embellishment of colour, by the admixture of coloured marbles or bronze. The same departure from simplicity pervaded their architecture. The most extensive and magnificent structures were erected, but in heavier proportions than the elegant Greek. Every member in the cornice of temple or public edifice became encumbered with a profusion of ornament, and an imposing heaviness of enrichment was the result. The interior of their buildings was decorated by sculpture and painting, and manufacturing design entered freely into their general domestic service.

The splendid and colossal edifices which adorned their cities, temples, palaces, and baths were crowded with works of art. Trajan's Basilica was most magnificent; its forum, temple, and approaches, crowded 12 acres; the hall, 540 by 168 feet, would have contained our St. Paul's; and its column was enriched by sculpture descriptive of the Roman victories over the Dacians. The Theatre of Marcellus was arranged in three tiers of columns, the lower of marble, the next of vitrified glass and the upper of gilded wood: it contains 3,000 statues in bronze. The palace of Dioclesian at Spatro was very celebrated; his baths accommodated 18,000 persons at one time. Those of Caracalla covered thirteen acres. These baths were a sort of vast club, in which every exercise of body or mind might be taken, every delight of the senses indulged, and the whole people met there. Gardens were raised about 30 feet above the general level, adorned with pavilions, and a great central building having an immense hall, obelisks, and fountains, fragrant shrubs, flowers, and the finest statues. During the first 300 years of the Christian æra seven of these baths were erected, well calculated to indulge that love of luxury which rapidly corrupted the Roman manners under the emperors, gratifying the constant love of excitement in novelty and splendour, which then gave popularity to the government. The number and beauty of their villas were amazing; built

Paper Hangings.

We present an historico-technical description from Bohn's admirable edition of Bechstein's "History of Inventions:"—

"Three kinds of paper-hangings have for some time past been much used on account of their beautiful appearance and their moderate price. The first and plainest is that which has on it figures printed or drawn either with one or more colours. The second sort contains figures covered with some woolly stuff pasted over them; and the third, instead of woolly stuff, is ornamented with a substance that has the glittering brightness of gold and silver. It appears that the idea of covering walls with parti-coloured paper might have readily occurred, but the fear of such hangings being liable to speedy decay may have prevented the experiment from being made. In my opinion the simplest kind was invented after the more ingenious, that is to say, when the woolly or velvet kind was already in use. The preparation of them has a great affinity to the printing of cotton. Wooden blocks of the like kind are employed for both; plates of copper are also used; and sometimes they are painted after patterns. Artists possess the talent of giving them such a resemblance to striped and flowered silks and cottons, that one is apt to be deceived by them on the first view. Among the most elegant hangings of this kind, may be reckoned those which imitate so exactly every variety of marble, porphyry, and other species of stones, that when the walls of an apartment are neatly covered with them, the best connoisseur may not, without close examination, be able to discover the deception. That the resemblance may be still greater, a hall may be divided by an architect into different compartments by pillars, so as to have the appearance of a grand piece of regular architecture. Whether M. Breitkopf, at Leipsic, was the inventor of this kind of hangings, I do not know, but it is certain that he brought it to great perfection.

"The second kind, or, as it is called, velvet-paper (now called flock-paper), is first printed like the former, but the figures are afterwards wholly, or in part, covered with a kind of glue, over which is strewed some woolly substance, reduced almost to dust, so that by these means they acquire the appearance of velvet or plush. The ground and the rest of the figures are left plain; but the whole process is so complex that it is impossible to convey a proper idea of it by a short description. The shearings of fine white cloth, which the artist procures from a cloth manufactory, and dyes to suit his work, are employed for this purpose. If they are not fine enough, he renders them more delicate by making them pass through a close hair sieve. This, as well as the third kind, was formerly made much more than at present upon canvas; and, in my opinion, the earliest attempts towards this art were tried, not upon paper, but on linen cloth. The paper procured at first for these experiments was probably too weak; and it was not till a later period that means were found out to strengthen and stiffen it by size and paste.

"The invention of velvet-paper is by several French writers ascribed to the English; and, if they are not mistaken, it was first made known in the reign of Charles I. On the 1st of May, 1634, an artist, named Jerome Lanyer, received a patent for this art, in which it is said he had found out a method of affixing wool, silk, and other materials of various colours upon linen cloth, silk, cotton, leather, and different substances with oil, size, and cements, so that they could be employed for hangings as well as for other purposes. The inventor wished to give to this new article the name of Londrindiana, which appears, however, not to have continued in use. It is worthy of remark, that this artist first made attempts to affix silk upon some ground; but that method, as far as I know, was not brought to perfection; that he employed for the ground, linen and cotton cloth, or leather; and that no mention is made of his having used paper, though he seems not to have confined himself entirely to leather or cloth.

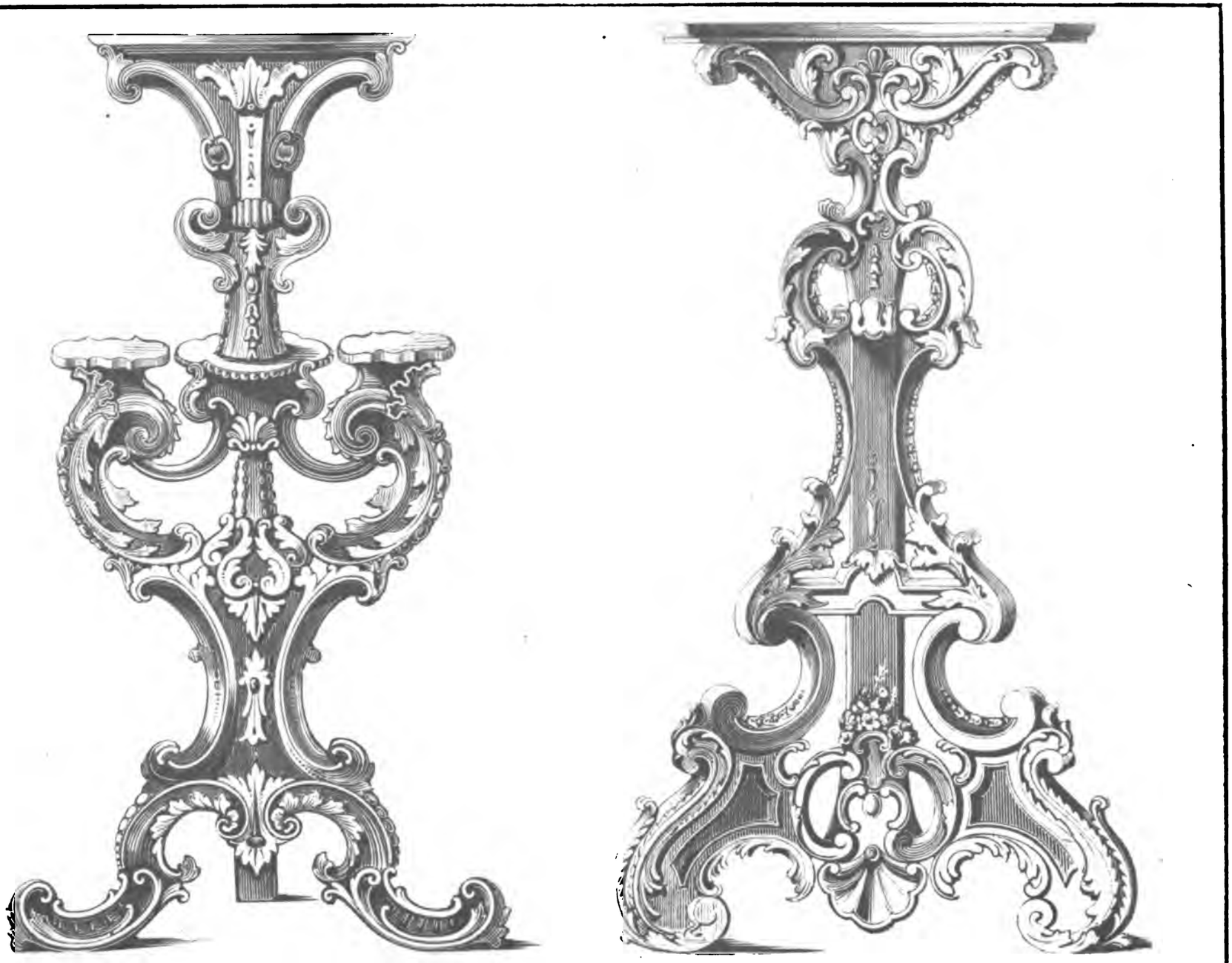
"Tierce, a Frenchman, has, however, disputed this invention with the English; for he asserts that one of his countrymen at Rouen, named François, made such kinds of printed paperhangings so early as the year 1620 and 1630, and supports his assertion by the patterns and wooden blocks which are still preserved with the abovementioned years inscribed on them. He is also of opinion that some Frenchmen, who fled to England when persecuted for their religion, carried this art along with them. The inventor's son followed this business to a great extent for more than fifty years at Rouen, and died in 1748. Some of his workmen went privately to the Netherlands and Germany, where they sold their art; and the French, therefore, with great confidence maintain, without knowing our artists and their works, that foreigners in this branch of manufacture are still far behind them. In most works of the kind my countrymen, indeed, are only imitators, not through want of talents to invent or to improve, but because our great people, for whom they must labour, consider nothing as fashionable or beautiful, except what has been first made by the French or the English.

"I shall here observe, that Nemeitz ascribes the invention of wax-cloth hangings, with wool chopped and beat very fine (these are his own words), to a Frenchman named Audran, who in the beginning of the last century was an excellent painter in arabesque and grotesque figures, and inspector of the palace of Luxemburg at Paris, in which he had a manufactory for hangings of that kind. What particular service he rendered to the art of making paperhangings, I have not, however, been able to learn. Equally uncertain and defective is the information of Von Heinecken, that one Eccard invented the art of imprinting on paperhangings gold and silver figures, and carried on a manufactory for such works.

"In regard to the time when these hangings began to be made in Germany, I can only say that the oldest information I know respecting them is to be found in a work by Andrew Glorez von Mahren, printed for the first time in 1670. It shews that the art was then very imperfect as well as little known, and that it was practised only by women upon linen for making various small articles.*

(*To be continued.*)

* "The author says, 'I shall give an account of a beautiful art, by which one may cover chairs, screens, and other articles of the like kind, with a substance of various colours made of wool, cut or chopped very fine, and cleaned by being made to pass through a hair sieve. * * I remember that two Swabian women travelled about through some countries, and taught people this art, by which means they gained a good deal of money.' Of the author I have been able to procure no information. His book is a compilation selected without any taste, and according to the ideas of the seventeenth century, from different writers, almost always without mentioning the sources from which the articles are taken; but it deserves a place in public libraries, because it contains here and there some things which may help to illustrate the history of agriculture and the arts."



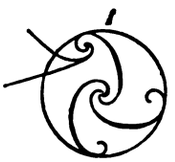
FLOWER STANDS (LOUIS FOURTEENTH).

DOOR PANELS, DATE 1540 (ARABESQUE).

Early Irish Ornament.

THE subjoined illustrations are borrowed from a very elaborate paper by Mr. J. O. Westwood, which appeared in Vol. x of the "Archæological Journal." They are doubly interesting — on account of their antiquity, and from being the earliest example of methodical or characteristic ornament in Ireland. The following is the explanation of the learned and diligent author:—

This ornament "consists of a number (2, 3, or 4) of spiral lines starting together from a central point, each of which, after several circumvolutions, goes off to another adjacent similar spiral, the direction taken by each line being constantly that of the letter C, and not scroll-wise, that of S. The principle of the ornament will be seen from the accompanying diagram (fig. 1), and the mode



1

2

of its more ordinary execution in fig. 2, copied from the heading of one of the large initial letters in the Gospels of St. Gall. The spirals in this ornament are composed of only two or three lines, each having the end next the centre of the circle thickened.* In none of these spirals, moreover, are there more than six circumvolutions, that is, each of the three spiral lines in the circle only makes two circumvolutions; but in the more elaborate MSS., as in the Gospel of Mac Regol and in the Paris Gospels, there are as many as 18 or 20 circumvolutions in a circle, drawn with extraordinary precision and delicacy. A peculiarity in the pattern further consists in having the open space between the adjacent whorls divided into equal sized spaces, coloured alternately light and dark, with a small transverse dark-pointed oval in the light ground, and a similar light coloured one in the dark ground. This ornament, with this additional peculiarity, is exactly represented in the early metal work in which the space between the whorls is raised to a ridge (the dark portion in fig. 2 representing the shaded side of the space), and the small-pointed ovals are impressed, giving to this portion of the design something of the appearance of one of the long ancient curved Irish trumpets, dilated at the mouth, which is represented by the ovals in question, and hence the pattern has obtained the name of the trumpet pattern in Ireland.

"The C-like arrangement of the spiral pattern," adds Mr. Westwood, "is so uniform that, in the very few instances in which it is departed from, either in metal, stone, or MS. ornamentation, we may suspect extraneous influence."

* "As a further instance of the manner by which an unequal number of spiral lines is produced in a given pattern, it may be mentioned that one of the Kilcullen crosses exhibits a panel containing a set of nine bosses (three in three rows) formed of spiral lines; the centre boss consists of four lines, extending to the middle boss on the top, bottom, and two sides. These four bosses consist of only three spirals, whilst the four at the four angles consist of only two spirals."

Technicologia.

130. *To Lead or Fix Mosaic Glass.*—Common window lead of the glaziers, but of very small dimensions, is to be laid round one of the middle pieces forming the glass painting, so as to hold in the groove of one of its sides, while in that of its other side another piece is to be inserted. Continue this constantly under the guidance of the cartoon, upon which the work may be laid, and working always from the centre of the picture outwards, soldering the several pieces of lead together during the process, by their ends of contact, which may be interlaid in the grooves at the corners where they join. For this, the soft or tin solder is required, and a glazier's common soldering iron, with a copper point, should be used for applying it. After this is heated in a charcoal fire it is to be rubbed in powdered hydrochlorate of ammonia and resin, and then on a piece of the solder, a portion of which will adhere to the copper and may be carried to the leaden bars. When the soldering is executed it will be well to touch over the junctures with dark oil colour, or, still better, with diluted sulphuric acid, in order to remove the bright metallic lustre, which might otherwise damage the effect of the painting.—*Dr. Gessert.*

131. *Graining and Marbling.*—On this subject a correspondent ("W. H. Y.") writes to us as follows, premising that he is in the habit of preparing first-class work for grainers, &c.:—"I wish," he says, "to call your attention to an article in vol. ii., page 20, of the UNIVERSAL DECORATOR, under the heading 'Graining and Marbling,' in which it is said that oak graining is executed with colour in turpentine, mixed with turpentine varnish; and that the lights are taken out with a camel's hair pencil or a rag moistened with turpentine. I am satisfied that the person who supplied that information is not a practical grainer; for the colour mixed with turpentine varnish will not bear varnishing. A small portion of japan gold size should be substituted for the varnish; and for taking out the lights the pencil will not do, and the rag is a sorry substitute. That which is invariably used by grainers is a small flat hog-hair French fitch, dipped in turps, and the marks or lights wiped off with a piece of flannel or soft rag."

132. *Cement for Enamelled Watch-dials.*—A cement comes into commerce from Vienna, for repairing the dial-plates of watches when parts of the enamel chip off. It is rather brittle, and is distinguished by its fine white colour and ready fusibility. From an analysis of Carl Knares, of Stuttgart, it consists of resins very colourless and very soluble in alcohol, with oxide of zinc. In the specimen examined there was 30 per cent of white zinc. Attempts to prepare a similar substance led to the following method :—Equal parts of dammara resin and copal, in pieces as colourless as possible, were reduced to a fine powder; to 5 parts of this mixture 2 parts of Venice turpentine were added, and the whole rubbed with as much spirit of wine as was sufficient to make it into a thick paste; 3 parts of the finest white zinc were then rubbed up with it. The mixture had now the consistence of a ground oil paint; on warming it until the whole of the alcohol was driven off, the mass was melted; and on cooling, had exactly the appearance and properties of the original sample of cement. The latter had, however, a slight tinge of blue, whilst in that made in imitation there was a slight tinge of yellow. This was corrected by the addition of a little Prussian blue to the alcohol used in rubbing up the paste, and a perfectly similar product obtained. The same results were obtained by melting the resins together, and adding the white zinc to the mixture in a melted state. The fusion of the resins must be conducted with the greatest care, in order not to colour it. In this case also a slight addition of Prussian blue to the mass is of advantage.

Heraldic Blazon.

(*Continued from page* 31.)

Guttés are somewhat similar to furs, excepting that they represent *liquid drops*, and are in number and name as follow :—

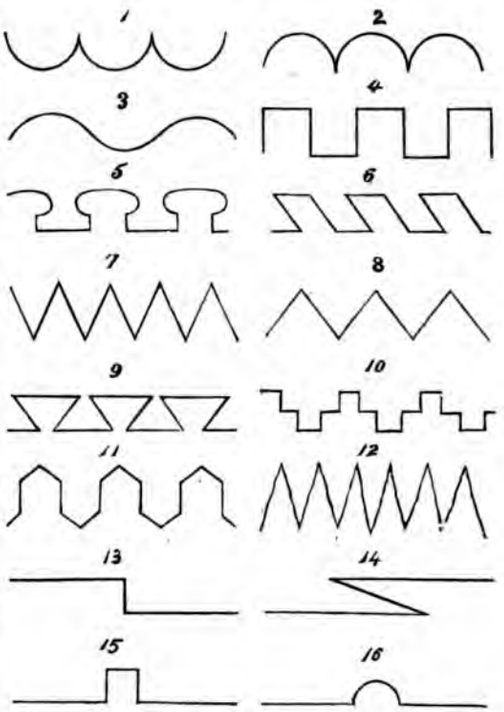
Gutté d'huile, or Gutté d'olive	Represent drops of oil. Painted vert.
Gutté de larmes	Sprinkled with tears. Painted water colour.
Gutté de l'eau	Sprinkled with water.
Gutté d'or	Drops of gold.
Gutté de poix	Sprinkled with pitch. Painted sable.
Gutté de sang	Sprinkled with blood. Painted red.

Gutté reversed, is when the drops are placed contrary to their natural position.

Small crosses, of various formation, fleurs de lis, &c., are often borne strewed over the field, which is termed semé, or semmé, of cross crosslets, fleurs de lis, &c., as the case may be.

Roundles, roundlets, or rounds, are small circular figures, thus o. When of metal, they are considered as flat pieces, but when of colour, globular. Roundles change their names according to their colours; thus roundles are called bezants, from coins struck at Constantinople, the Byzantium of the ancients. Argent is plate, also supposed to represent a coin. Vert is pomeis, representing an apple. Azure is hurt, or the hurtle berry, representing a wound. Sable is ogress or pellet, representing cannon balls. Gules is torteaux, representing cakes, bowls, or wounds. Purpure is golpes, representing wounds, pills, or boluses. Tenné is oranges, so called after the fruit. Sanguine is guzes, a red hot ball. Fountain is divided horizontally by wavy lines into six pieces, painted alternately argent and azure.

The field is sometimes parted by lines either straight or crooked. Straight lines are carried evenly through the escutcheon, and are of four different kinds, namely, a perpendicular line |, a horizontal —, a diagonal dexter, \ a diagonal sinister /. Crooked lines are those which are carried unevenly through the escutcheon.



1, The engrailed; 2, the invected; 3, the wavy; 4, the embattled or crenelle; 5, the nebulé; 6, the regulé; 7, the indented; 8, the dancette; 9, the dove tail; 10, the battled embattled; 11, the champaine; 12, rayonne; 13, angled; 14, bevilled; 15, escartele; 16, nowy.

These lines not only vary the disposition of colours in the field, but are also generally used to alter the character of the principal ordinaries; and were adopted in the earliest times of heraldry.

The principal reason why lines are thus used in heraldry, is to distinguish bearings which would otherwise be the same.

As the lines above mentioned serve to divide the field, it must be observed that if the division consist of two equal parts formed by the perpendicular line, it is called parted per pale; by the horizontal line, parted per fess; by the diagonal dexter, parted per bend; and by the diagonal sinister, parted per bend sinister. If a field be divided into four equal parts by any of these lines, it is said to be quartered. Parted per saltier is made by two diagonal lines, dexter and sinister, crossing one another in the centre of the field, and likewise dividing it into four equal parts.

(*To be continued.*)

Architectural Glossary.

(*Continued from page* 36.)

ANGLE-BEAD. A piece of wood placed vertically, and fixed upon the exterior or salient angles of apartments, having their horizontal section about three-fourths of a circle when they are formed with a single bead; when formed with a cluster, the centre one is larger than the rest, and projects so as to form the *angle bead*. Its use is to secure the angle against accident, and to serve as a guide for floating the plaster.

ANGLE-CAPITAL (in Greek architecture). Those Ionic capitals placed on the flank columns of a portico, which have one of their volutes placed at an angle of 135° with the plane of the frieze.

ANGLE-STAFF. See ANGLE BEAD.

ANNULET (from the Latin *annulus*, a ring). A small fillet or band, with a circular horizontal section, encircling the lower part of the Doric capital, immediately above the neck or trachelium. It may be used by itself or in connection with other mouldings; and it is not infrequently several times repeated, as many as five having been employed. It is also used as an ornament of the base of the column, and sometimes in various situations, independent of rule. The annulet is also called a fillet, listil, or cincture, or a list, timea, or eyebrow.

ANTE (from Greek *anti*, opposite). The pier-formed ends of the walls of a building, as in the portico of a Greek temple. Some, however, say the square column or pilaster at the corner of a building, or the jambs or square pillars on each side of the door of a temple.

ANTEFIXES. "Ornamented tiles placed on the top of the cornice or eaves at the end of each ridge of tiling; sometimes of marble, but generally of terra cotta, and ornamented with a mask, honeysuckle, or other decoration moulded on them."—*Glossary of Architecture.*

ANTEPAGMENTA (Latin). "The jambs or moulded architraves of a door. The lintel returning at the ends with similar mouldings down upon the antepagmenta was called supercilium."—*Gwilt.*

APOPHYGE (Greek *apophyge*, a flying off). "The lowest part of the shaft of an Ionic or Corinthian column, or the highest member of its base, if the column be considered as a whole. The apophyge is the inverted cavetto of concave sweep, on the upper edge of which the diminishing shaft rests."—*Ency. Brit.*

APSE. A recess of a semicircular form, generally roofed by a semi-circular dome.

APTERAL. A temple having no columns, or a building without wings.

AREOSTYLE (Greek *araios*, rare or weak, and *stylos*, a column). A wide intercolumniation, generally of four diameters.

ARRODYSTYLE. An arrangement of coupled columns, similar to that shewn in the western front of St. Paul's Cathedral.

ARABESQUE STYLE. (See Indexes.)

ARABO-TEDESCO (meaning Arabian and German). A mixture of the Moorish, or low Greek, and German Gothic styles.

ARCADE (French). A series of arches springing from piers or pillars.

(To be continued.)

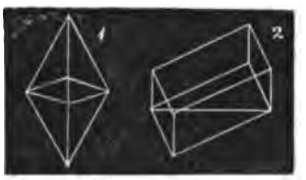
Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

By FRANCIS BENJAMIN THOMPSON.

CHAPTER V. (*continued*). — INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Sulphur (continued). The primitive form of sulphur is that of an acute octahedron with a rhombic base (fig. 1); but after melting it assumes the shape of an oblique rhombus (fig. 2).



Dumas gives the following as the changes undergone by sulphur when exposed to varying temperatures:—

Temp. Fahr.	Hot Sulphur.	Sulphur suddenly cooled by immersion in water.
230°	Very liquid: yellow	Very friable: usual colour
284	Liquid: deep yellow	do. do.
338	Thick: orange yellow	Friable do.
374	Thicker: orange	At first soft and transparent, then friable and opaque: usual colour
428	Viscid: reddish	Soft, transparent: amber colour
464 to 500	Very viscid: brown red	Very soft, transparent: reddish
About *600	Less viscid: brown red	Very soft, transparent: brown red

*Its boiling point.

Sulphur may be readily formed into crystals by a peculiarity in the melting. Common roll sulphur exhibits only a crystalline or minute crystal fracture. But if this be melted, and allowed to cool slightly, and an incision be then made in the crust which will cover the top, the contents poured out, and allowed to solidify, the mass will, on cleavage, exhibit fine crystals of characteristic form.

"When sulphur," says Professor Brande, "which has been heated to about 300° F. is poured into warm water, it acquires the consistency of soft wax, and hardens on cooling. In this state it is sometimes used to take impressions of gems and medals. When slowly cooled after fusion, sulphur forms a fibrous crystalline mass; but it sometimes retains its fluidity and does not concrete till touched by some solid body."

(To be continued.)

CORRESPONDENCE.—"G. R. T."—We are thankful for your encomium. We do not understand your remark about designs for low-priced tombstones. Do you mean stones without ornaments? It is our object in this work to furnish designs, irrespective of expense in carrying them out. We leave it to our readers to modify and alter them as they like. Do you mean metal casts in plaster moulds, or casts in plaster from plaster? The first require pressure, and the second need great dryness and a waxy surface.——"W. H. Y."—We have inserted your annotation in the Technicologia. Could you supply us with a sketch of one of the panels you refer to, as we do not exactly comprehend your meaning?

Paper Hangings.

(*Continued and concluded from page* 40.)

"One of the most ingenious new improvements in the art of manufacturing these hangings, consists in bestrewing them here and there with a glittering metallic dust or sand, by which they acquire a resemblance to rich gold and silver brocade. From the above-quoted work it appears that artists began very early to cover some parts of paper-hangings with silver-dross or gold foil; but as real gold was too dear to be used for that purpose, and as imitations of it soon decayed, this method seems not to have been long continued. Instead of these, Nuremberg metallic dust as well as silver-coloured foil are employed. Metallic dust is the invention of an artist at Nuremberg named John Hautsch, who constructed also a carriage which could be moved by the person who sat in it. He was born in the year 1595, and died in 1670. His descendants have continued to the present time the preparation of the metallic dust, which is exported in large quantities from Nuremberg, and is used in shell-work, lacquered-ware, and for various other purposes. It is prepared by sifting the filings of different metals, washing them in a strong lye, and then placing them on a plate of iron or copper over a strong fire, where they are continually stirred till their colour is altered. Those of tin acquire by this process every shade of gold colour, with a metallic lustre; those of copper the different shades of red and flame colour; those of iron and steel become of a blue or violet; and those of tin and bismuth appear of a white or bluish-white colour. The dust, tinged in this manner, is afterwards put through a flatting-mill, which consists of two rollers of the hardest steel, like those used by gold and silver wire-drawers, but for the greater convenience a funnel is placed over them. I have in my possession samples of all the above kinds, which have an exceedingly beautiful appearance. This metallic dust is affixed so strongly to paper by means of a cement, that it is almost impossible to detach it without tearing the paper, as is the case with the paper-hangings procured from Aachen. In French, such paper is called *papier avec paillettes*. The lustre of it is so durable that it continues unaltered even on the walls of sitting apartments. The metallic dust, however, has a considerable weight, which may undoubtedly injure the paper.

"This inconvenience may have induced artists to employ, instead of metallic dust, that silver-coloured mica, which has been long used in the like manner. So early as the seventeenth century the miners at Reichenstein in Silesia collected and sold for that purpose various kinds of mica, even the black, which acquires a gold colour by being exposed to a strong heat. The nuns of Reichenstein ornamented with it the images which they made, as the nuns in France and other Catholic countries, ornamented their *agni Dei* by strewing over them a shining kind of talc. The silver-coloured mica, however, has not such a bright metallic lustre as metallic dust, but it nevertheless has a pleasing effect when strewed upon a white-painted ground, and its light thin spangles or scales retain their brightness and adhere to the paper as long as it lasts. At present I am acquainted with no printed information respecting the method of laying on metallic dust and mica, nor do I know where artists procure the latter, which in many countries is indeed not scarce. I shall here observe that I once saw at St. Petersburg a kind of Chinese paper which appeared all over to have a silver-coloured lustre, without being covered with any metallic substance, and which was exceedingly soft and pliable. It bore a great resemblance to paper which has been rubbed over with dry acid of borax. I conjecture that its surface was covered with a soft kind of talc, pounded extremely fine; but as I have none of it in my possession at present, I can give no further account of it."

["The manufacture of this important and elegant substitute for the ancient 'hangings' of tapestry has undergone a gradual succession of improvements, and has now reached a high state of beauty and perfection. The patterns on these papers are sometimes produced by stencil plates, but more commonly by blocks, each colour being laid on by a separate block cut in wood or metal upon a plain or tinted ground. The patterns are sometimes printed in varnish or size, and gilt or copper leaf applied; or bisulphuret of tin is dusted over so as to adhere to the pattern; and in what are called *flock papers*, dyed wools mixed into powder are similarly applied. Powdered steatite or French chalk is used to produce the peculiar gloss known under the name of *satin*. Striped papers are sometimes made by passing the paper rapidly under a trough, which has parallel slits in the bottom, through which the colour is delivered; and a number of other very ingenious and beautiful contrivances have lately been applied in this important branch of art.

"The invention of the paper machine, by which any length of paper may be obtained, effected a great change in paper-hangings, which could formerly only be printed upon separate sheets, and were much more inconvenient to print as well as to apply to the walls."*]

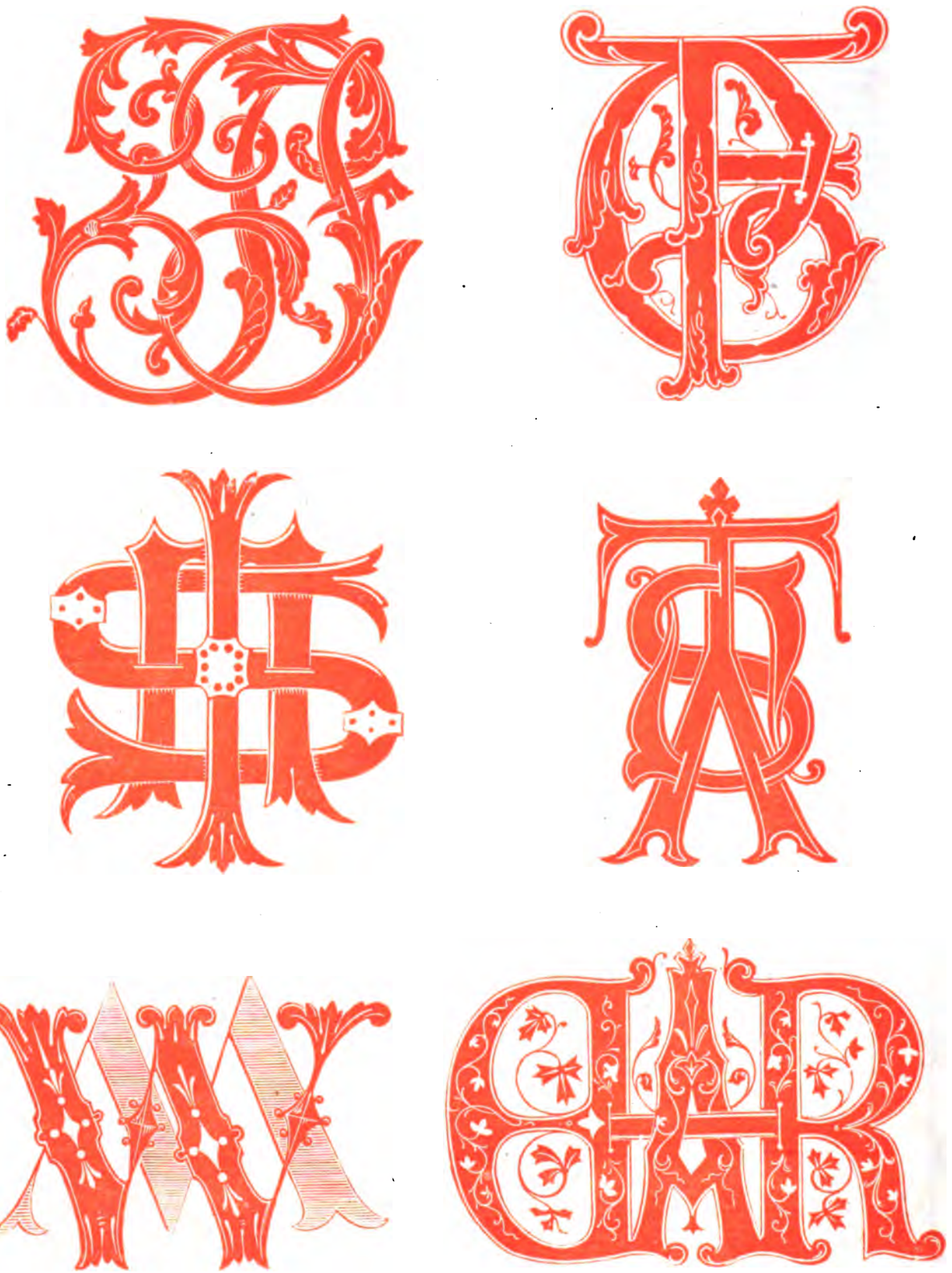
DECORATIVE OIL PAINTING.

In the 15th century, the use of oil seems to have predominated. Although scarcely capable of the same fixity of tints as the older compositions, oil has been found to possess many qualities that render it superior in handling, combining more readily with the various pigments, and flowing freely. The modes of preparing oil for colouring, however, appear to have been different to those now in use: few ancient specimens will be found that have received more than a single coat of paint, whereas, on the modern system, the work must be painted over several times before an even surface or an equal intensity of tint can be produced. These repeated coats are destructive of all nicety and finish. When any extent of wall surface was proposed to be painted, it was usual to cover the stone work with a thin coat of plaster or whiting, for the purpose of concealing the joints and affording a better ground. The ground thus gained was, in works of importance, very carefully prepared with size of thin glue or of gum Arabic dissolved in water, with the addition of a little dry white lead or sheepskin size, to prevent the too great absorption of colour. For gilding, sizes similar to those now or lately in use were adopted, and laid as a second coat over the previous ground. The gilding of middle-age works will generally be found to have been performed in a superior manner, and to have stood well. In appearance, these paintings most nearly resemble flatted work varnished: the colours have in general more force than is usually attained by modern oil—glossy, yet free from glaze, and possessing considerable body. They are not absorbed by wood or stone, nor do they adhere very tenaciously. Though easily separable from the ground, they are not liable to crack.—*J. Whichcord, jun., A.R.I.B.A.*

* Brande's "Dictionary of Science."

MONOGRAMS OF THE ISM, SAL, MW, FARO

CORNER AND CENTRE—ARABESQUE.



MONOGRAMS — PP. TPP. ISM. SAT. WW. EARH.

CORNER AND CENTRE—ARABESQUE.

Inventions.

DOCTOR JOHNSON, on the authority of the poet, Milton, defines an inventor to be "a finder out of something new." Now, we put it, what is "something new?" We well recollect the proverb from Solomon about there being nothing new under the sun; but while we are willing to give every credit to the original moulders of Assyrian bricks, or Egyptian workers in embroidery, we are decidedly reluctant to admit the claims of adventurers swarming around us, who with, at the best, superficial knowledge of the sciences, peck at the principles that have been long ago published in their respective text-books—the class books of students—and actually have the impudence to take out royal letters patent, or complete or provisional registration. It is a fact, that one-half of the modern chymical patents are neither more nor less than "cribs" from Brande and Ure. We had an example of this when the so-called "artificial ivory"—merely a synthesis of one of the commonest analyses in schoolboy chymistry—the structure of bone—was brought out for the manufacture of the plates used for photographic miniatures. We adverted to that subject in our first volume, and certainly felt, if we did not express, considerable surprise at the appropriation of a chymical principle that consisted only in mixing an alkaline earth with phosphoric acid—as exclusive property, and putting the patent seal upon it: meanwhile, we being conscious that years ago we cast blocks and slabs from the same material, with no thoughts of ulterior emolument, besides the gratification of having carefully conducted a simple experiment.

But we have now to deal with a discovery which is asserted to be new, and which we admit to be strange, but whose originality we are prepared to denounce as one of the most presumptuous pretences heard of within the century.

We need not be lengthy in our remarks. From time out of mind, men have been in the habit of taking the newly-flayed skins of animals and immersing them in what is technically called "tan," in order to convert the skin into leather. The rationale of this is, that animal skin abounds in gelatine, which in a pure state is very soluble, and extremely liable to decompose and become fœtid. Tan is an extract of bark, the tannin in which combines with the gelatine of the skin, rendering it fit for manufacturing use. This process is not only a fact in manufactures but in chymistry also. Every tyro knows that tannin precipitates gelatine; and accordingly a lot of "tyros" have "discovered" or "found out" that paper coated with gelatine and afterwards tanned possesses many of the properties of parchment. They have also applied the method to tracing paper.

This precious "discovery" has been patented and breveted in England and France, after gelatine cards have been hawked about the streets for years; and the writer of this article has successfully produced papers suited for drawing, tracing, and printing, and has actually at this moment apparatus at one of the morning newspaper offices which was employed in 1855 for the purpose. As regards drawing or tracing paper, here is the receipt for our readers: brush over thinly one or both surfaces of the paper with liquid gelatine; when nearly dry brush it over with a colourless solution of tannin. By this means you may make your drawings or tracings last for ages instead of a few years. That's the patent!

Carlyle on the Fine Arts.

"May the Devil fly away with the Fine Arts!" exclaimed confidentially once, in my hearing, one of our most distinguished public men; a sentiment that often recurs to me. I perceive too well how true it is, in our case. A public man, intent on any real business, does, I suppose, find the Fine Arts rather imaginary. The Fine Arts, wherever they turn up as business, whatever committee sit upon them, are sure to be the parent of much empty talk, laborious hypocrisy, dilettantism, futility; involving huge trouble and expense and babble, which end in no result, if not in worse than none. The practical man, in his moments of sincerity, feels them to be a pretentious nothingness; a confused superfluity and nuisance, purchased with cost—what he in brief language denominates a *bore*. It is truly so, in these degraded days: and the Fine Arts, among other fine interests of ours, are really called to recognise it, and see what they will do in it. For they are become the throne of Hypocrisy, I think the highest of her many thrones, these said Arts; which is very sad to consider! Nowhere, not even on a gala-day in the Pope's Church of St. Peter, is there such an explosion of intolerable hypocrisy, on the part of poor mankind, as when you admit them into their Royal Picture-gallery, Glyptothek, Museum, or other divine temple of the Fine Arts. Hypocrisy doubly intolerable; because it is not here, as in St. Peter's and some other churches, an obliged hypocrisy but a voluntary one. Nothing but your own vanity prompts you here to pretend worshipping; you are not bound to worship, and twaddle pretended raptures, criticisms, and poetic recognitions, unless you like it;—and you do not in the least know what a damnable practice it is, or you wouldn't! I make a rule, these many years back, to speak almost nothing, and encourage no speech in picture-galleries; to avoid company, even that of familiar friends, in such situations; and perambulate the place in silence. You can thus worship or not worship, precisely as the gods bid you; and are at least under no obligation to do hypocrisies, if you cannot conveniently worship.

The fact is, though men are not in the least aware of it, the Fine Arts, divorced entirely from truth this long while, and wedded almost professedly to falsehood, fiction, and such like, are got into what we must call an insane condition: they walk abroad without keepers, nobody suspecting their sad state, and do fantastic tricks equal to any in Bedlam,—especially when admitted to work "regardless of expense," as we sometimes see them! What earnest soul passes that new St. Stephen's, and its wilderness of stone pepperboxes with their tin flags atop, worth two millions I am told, without mentally exclaiming *Apage*, and cutting some pious cross in the air! If that be "ideal beauty," except for sugarwork, and the more elaborate kinds of gingerbread, what is real ugliness? To say merely (with an architectonic trumpet-blast that cost two millions), "Good Christians, you observe well I am regardless of expense, and also of veracity, in every form?" Too truly these poor Fine Arts have fallen mad!

The Fine Arts once divorcing themselves from *truth*, are quite certain to fall mad, if they do not die, and get flown away with by the Devil, which latter is only the second-worst result for us. Truth, fact, is the life of all things; falsity, "fiction," or whatever it may call itself, is certain to be death, and is already insanity, to whatever thing takes up with it. Fiction, even to the Fine Arts, is not a quite permissible thing. Sparingly permissible, within iron limits; or if you will reckon strictly, not permissible at all! The Fine Arts too, like the coarse and every art of man's godgiven faculty, are to understand that they are sent hither not to fib and dance, but to speak and work; and, on the whole, that God Almighty's *facts*, such as given us, are the one pabulum which will yield them any nourishment in this world. O Heavens, had they always well remembered that, what a world were it now!

Strengthening Panels for Oil Paintings.

By Sir C. L. EASTLAKE.

Panels on which fine pictures have been executed, are often injured by the misapplication of parquetting. It would, therefore, appear that the method of safely strengthening wood by ledges, however familiar to cabinet makers, is not so generally understood as could be wished. The fibres of a plank of wood, sawn in the usual way, run lengthwise. The expansion or contraction which can take place acts chiefly, if not solely, at right angles to the direction of those fibres. When this action is equal on both surfaces of the plank, the wood preserves its plane, although it may be altered in lateral extent. When the action is greater on one surface of the plank than on the other, whether from a difference of temperature or from any other unequal conditions, the wood is not only altered in lateral extent, but ceases to be flat, and is said to wind or warp. In this partial alteration, concavity indicates the shrinking of the surface; such shrinking being generally the consequence of the evaporation or destruction of the sap. If a thin piece of wood be exposed to heat till it begins to be charred, it will become concave on the side next the fire. The expansion or contraction of wood, under ordinary circumstances, is attributable to the presence or absence of moisture. A coat of paint, inasmuch as it protects the surface of the wood from moisture, and prevents evaporation, is to be considered as tending to produce warping, if confined to one side, or if its effect be not otherwise counteracted. The warping of wood may be guarded against by forcible means; but the application of such means with a view to prevent its splitting will generally accelerate the evil it is intended to obviate. The wood being assumed to be well seasoned, the surest way to prevent its splitting is to leave it free to expand or contract according to the changes of temperature. If this free action be restrained in any point, the substance will, sooner or later, in all probability, rend somewhere. The first principle to observe, therefore, is never to glue or in any way immovably fasten to the wood a ledge or batten in a direction contrary to that of the fibres. But, as ledges may require to be placed in that direction to prevent the warping of the panel, they should be attached in such a manner as, in answering that end, to allow of the lateral expansion or contraction. The general principle thus proposed may be carried out in various ways. The usual and effectual mode adopted in carpentry is to sink dovetailed ledges in corresponding grooves at the back of the panel. The ledges are not glued or even tightly fitted, but their keyed form prevents their falling out; and when used in a vertical direction, as in dadoes, they rest on the floor. They may or may not be flush with the surface of the wood, according to its thickness; in general, they project above it. Another mode which has been adopted with success for picture panels (which are sometimes too thin to admit of sinking grooves in them with safety), is to glue battens, formed of a wood not firmer than that of the panel, in a direction parallel to that of the fibres. The ordinary glue, thus applied on a narrow extent only of surface, will always expand as much as the wood of the panel; so will the battens. Thus, no force is applied sufficient to restrain the free action proposed. Each of the battens is grooved at corresponding intervals on its under side, next the panel; and through these grooves flat iron pieces, touching the panel, are passed. These, which are at right angles to the battens, and consequently at right angles also to the direction of the fibres of the panel, are not only not glued, but are not even tightly fitted. They are secured at each end, so as not to slip out, by not passing through the two last battens, which are consequently fastened on afterwards.

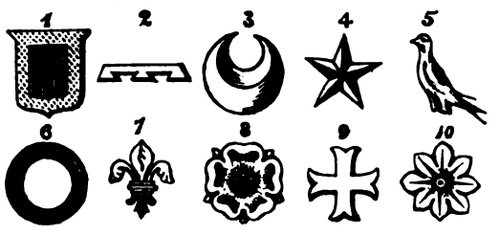
SCULPTURE IN ENGLAND.

Before the time of Charles I., the sculptor seems to have been hardly regarded as an artist; and the first Englishman of any eminence, Epiphanius Evesham, has left us no trace by which we can distinguish his works from those of others. The tombs of Sir Francis Vere, however, and of Lord Norris, in Westminster Abbey (both executed early in the 17th century), present us with figures of great beauty and expression. Nicholas Stone is the best known sculptor under King James I.; but his works are chiefly remarkable for their transition to the modern style of monumental composition, and the adoption of the Roman costume, afterwards so universal. Under Charles I., several foreign artists of distinction came over, of whom Hubert le Sœur was the chief, and, indeed, the first of this time who successfully followed the highest branches of the art. He executed many works in bronze, of which the beautiful equestrian statue of his royal patron at Charing Cross still remains. This relic was condemned to be broken up by the Parliament, but was concealed by the brazier, John Rivet, who bought it as old metal, and was replaced in 1678; in the meantime, the worthy brazier sold its pretended fragments at a good profit to the ardent royalists. Charles had also a bust taken of himself by Bernini, from a picture painted for the purpose by Vandyck. What became of this bust is not certainly known. After the Restoration, sculpture was almost exclusively applied to decoration, and only two artists have at all distinguished themselves. The fame of Cibber rests upon his two figures of Raving and Melancholy Madness in the hall of Bethlem Hospital, and Grinling Gibbons has executed little beyond his marble statue of Charles II. in the Royal Exchange, and bronze figure of James II. in the Privy Gardens. It is as a carver in wood, however, that the name of Gibbons is best known; and in that branch his exquisite productions, which rival the lightness and delicacy of Nature herself, have certainly never been surpassed.—*Ecclestone's "Intr. to English Antiquities."*

Heraldic Blazon.

(*Continued from page 42.*)

Bordures, or differences, have long been nearly abandoned; yet their occurrence in the arms of contemporary personages requires that their peculiarities should be noted. The bordure is, then, a bearing that goes all round the shield, parallel to the boundary of the escutcheon. It was originally used for noting a diversity between particular persons descended of one family and from the same parents. (Fig. 1.)



The above would be described, gules, a bordure or.

It is, however, the modern custom to employ the following nine marks of distinction only.

Fig. 2 is for the first born or heir. It is called the label.

3. The crescent. Second son.
4. The mullet. Third son.
5. The martlet. Fourth son.
6. The annulet. Fifth son.
7. The fleur de lys. Sixth son.
8. The rose. Seventh son.
9. The cross moline. Eighth son.
10. The double quatrefoil. Ninth son.

"As to the distinction to be made in the arms of the offspring belonging to each of the above-mentioned brothers, it is expressed by certain figures. For instance, the heir or first son of the second house bears a crescent charged with a label during his father's lifetime only; the second son of the second house, a crescent charged with another crescent; the third son of the second house, a crescent charged with a mullet; the fourth son of the second house, a crescent charged with a martlet; the fifth son of the second house, a crescent charged with an annulet; the sixth son of the second house, a crescent charged with a fleur de lys; and so on of the other sons, taking care to have them of a different tincture.

"It must be observed, that of all the above-mentioned marks of distinction, none but the label is used for distinguishing the younger sons of the royal family; and this label is varied by additional pendants and distinct charges. The Prince of Wales always bears the plain label argent. The daughters of the blood royal all bear the label of distinction the same. The theory of this practice of differencing the arms of the royal children is, that none of the children of the sovereign are entitled to arms by descent, as the arms of their father are those of the state. When the sons and daughters of the reigning monarch receive permission to use the royal arms, they are assigned to them differenced by a label, charged with some distinguishing mark."*

(*To be continued.*)

* "Ency. Brit."

Technicologia.

133. *Electro-Bronzing.* — Metals may be bronzed electro-chymically in a water solution composed of 500 parts of carbonate of potash, 20 of chloride of copper, 40 of sulphate of tin, and 250 of nitrate of ammonia. For a brass deposit, zinc is substituted for tin.

134. *French Copying Alloys.*—For ornaments in general: bismuth, 3 lbs.; lead, 2 lbs.; tin, 1 lb. Melts at 201° F. For cameos: bismuth, 8 lbs.; lead, 5 lbs.; tin, 3 lbs. Melts at 190° F.

135. *Inlaying Glue for Metals.*—1 pint of common glue, ready made; finely powdered resin, 1¼ oz.; fine brick dust, 1¼ oz. Well incorporated. Additional isinglass, in solution, is sometimes added to the glue.

136. *To Impart a Blue Colour to German Silver or Argentine.*—Place a plate of metal, three or four inches square (previously thoroughly polished) in a vessel containing vegetable mould. Attach to it a moderately thick zinc wire, sticking its other extremity into the mould. Then pour into the vessel a slightly concentrated solution of hydrocyanate of potassa and protochloride of iron in water. The metallic plate must be completely immersed. At the expiration of a few seconds, the argentine will be covered with a beautiful blue colour which, though it does not stand much rubbing, is yet sufficiently adherent to render the application of the process useful.

137. *Balls's Varnish for Objects of Natural History.*—Mucilage of gum tragacanth, 1 oz.; mucilage of gum Arabic, 1 oz.; mix; add spirit with corrosive sublimate, so as to precipitate the stringy portion of the gum.

138. *To Gild Glass, Porcelain, &c.*—For this purpose, the gold is dissolved in aqua regia, and the acid is driven off by heat, or the gold may be precipitated by means of sulphate of iron. In this pulverulent state, the gold is mixed with one-twelfth of its weight of oxide of bismuth, together with a small quantity of borax and gum water. The mixture is applied to the articles with a camel's hair pencil, and after passing through the fire, the gold is of a dingy colour, but the lustre is brought out by burnishing with agate and bloodstone, and is lastly cleaned with vinegar or white lead.

Colour in Decorative Art.

The following passages are extracted from a little work on the principles of colour, written by Mr. G. B. Moore:—

"Of the positive primary colours, it is difficult to find distinct types of each in nature unmingled with the others, and we must speak of them relatively. Thus, if we assume carmine to be the type of pure red, vermilion becomes an orange; and if, on the reverse, we consider vermilion as red, carmine changes to crimson, or belongs to the purple class. The same relation will be found in the tints of gamboge with ochre to yellow; and of ultramarine with cobalt, Prussian blue, and indigo, to blue. The purest unmixed primitive colours are to be found in flowers.

"There can, strictly speaking, be only delicate and full tints of the primary and secondary classes; as the less positive hues, being caused by the mixture of the positive colours with their complementary hues, are tertiaries and quartiaries. We are accustomed to give the name of positive colours to hues varying from the fullest or brightest tints to very subdued shades.

"In the works of Creation, the same proportion of the various classes of colours generally prevails. In the bright skies of southern climes, where appears the greatest quantity of a primitive colour to be found in nature, the blue is concentrated at the zenith, from whence it graduates into the tertiary or quartiary hues of the horizon. In sunrise or sunset the combinations of the blue with the yellow, orange, or red tints, are effected by intermediate hues of the secondary, tertiary, quartiary, and neutral classes; the effect being often heightened by the bright orange lights of the clouds being directly opposed to the complementary blue, one of the most beautiful contrasts in colour, and the subdued gray shadows of clouds opposing and giving brilliancy to the warm bright colour round the sun. At this period may be observed the beauty of gradation, buildings and other objects being often seen in deep contrast with the warm brilliant colour, the darkest portion being often directly opposed to the brightest lights with the greatest force, and never appearing harsh in nature, owing to the opposing light and shade being concentrated and graduated in strength.

"We are accustomed to speak of the green hills and foliage of nature, but there are seldom any flat unbroken tints; the bright green of the foreground is varied by lights, reflections, and other incidents, and soon mingles with the brown olive and gray hues which compose the mass of the landscape. The various hues of corn, from the pale straw of summer to the golden tones of autumn, have distance to graduate and soften their effect on the eye, and are supported by the more subdued hues accompanying them. In the decoration of the interior of buildings we seldom can rely on distance to moderate the crude effect of positive colours, but must have recourse to other means. It is in gems, flowers, fruit, shells, birds, insects, and the smaller objects of creation, that we find the most positive colours, and then in most instances in graduated tints; the beautiful smooth and furred skins of large and small quadrupeds, and the plumage of the larger birds, are of the less positive hues: in the peacock the positive colours are confined to small parts, and the greater mass of the feathers are of the more subdued hues. The same arrangement may be observed generally in the smaller birds and most insects. The most positive coloured flowers are surrounded and relieved by leaves of a comparative low key or subdued hue; the great value of which to the brighter colour of the flowers may be easily ascertained by surrounding a flower with a corresponding quantity of green, of the same key or brilliancy as the flower. The harmonious combinations of colours in shells is in general of the delicate tints and rich subdued hues.

"In an example, the admiration of which is not confined to artists—the female face—how little positive colour is to be found, the red concentrated in the lips, and blending through the carnations with the complexion; the blue only occasionally seen in the eyes, and yellow never alone or unmixed with its complementaries; the mass of the complexion being formed of brilliant, delicate, or rich tertiary and quartiary hues, supported by deeper tones of the same classes in the hair. These magical combinations of hues have been the study of artists of all countries and ages, and the successful transference of them to their canvas, the ambition of the greatest colourists; the complexions of dazzling white happily existing only in imagination.

"It is often supposed that the tertiary and quartiary hues must be dull and gloomy, but the above example, and a glance at the silks and satins most in favour, which are generally of these classes, will dispel the illusion and prove that in them may be found hues varying from the most delicate to the richest.

"The eye is less excited or fatigued by small than large masses of positive colour; consequently, the smaller the object, the more positive may be the tint, and in viewing small objects it is difficult to shut out of view the surrounding hues which act in support and relief of the positive colours; also the unconscious continual motion of vision suffers it to dwell less on small spaces of colour than larger masses. Dresses, draperies, and ornamental articles of manufacture, being generally seen in connexion and combination with other objects, may be composed of the more positive tints in proportion to their size.

"Thus we find the general combinations or arrangement of colours in nature beneficently adapted to the requirements of human vision, and the great painters of the middle ages, having discovered the principles, have applied them in the works that now command the admiration of mankind. It appears, therefore, that if the principles found in nature, and adopted in the works of the greatest colourists, are correct, we should use the tertiary, quartiary, and neutral hues, for the greater quantities, and reserve the primary and secondary positive colours to heighten the effect, or attract attention to the points of interest. As far as I can recall to memory the effect of various edifices, the most successful appear to have been decorated on the above principles; but the decoration of buildings, like pictures, often improves, as well as suffers, by the hand of time, and it is difficult to say how far the harmonious mellow effects of the older buildings may not have arisen from the crude positive colours being softened and subdued by age, though we can generally judge if portions have been decorated in brighter tints than the rest. In the Gothic churches in Belgium and France, the greater quantity of the walls was generally left uncoloured, the subdued broken hues of the stone and rich carved wood-work, forming a relief to the more positive colour of the glass windows, pictures, and marbles; and where marbles were much used, as at St. Mark's, Venice, the greater proportions were generally of rich deep harmonious hues, and the brighter marbles reserved for the altars, shrines, &c. At St. Peter's, and the other Basilicas of Rome, the marbles form intermediate hues between the more positive colour of the pictures, mosaics, &c., and the subdued hues of the walls. In some of the more modern churches in Italy, contrast seems to have been the guiding principle in the application of marbles, and the effect is very inferior to the older buildings. In the Italian churches that have been decorated with frescoes, the positive colours being generally confined to the draperies of the figures, leave the greater quantities to the more subdued hues, and in some, where time has broken and subdued the crude tints, as in the upper church of the Convent at Assisi, the effect is most beautiful. A beautiful specimen of the same harmonious combination of subdued hues, copied from the tombs at Zanthus, is to be seen in the Lycian room at the British Museum. In the Cathedral of Milan the vaulting had been formed of brickwork, covered with plaster, which having decayed in parts, formed with the brickwork the most harmonious combination of subdued hues. Instead of taking advantage of and copying the same harmonious colours in the decorative repairs, in 1832, the vaulting was being painted with the representation of light perforated panelling, out of character with the massy pillars supporting it.

(To be continued.)

OLD ENGLISH.

GOTHIC CAPITALS.

Floorcloths.

ALTHOUGH the use of floorcloths, from their natural defects as to warmth, &c., is generally restricted to passages, halls, corridors, antechambers, and staircases, still their manufacture constitutes a very important branch of trade, and one which seems to be rather on the increase than otherwise.

They are made partly of flax and partly of hemp, the former being the cheaper of the two, but the latter better fitted to retain the oil and paint on the surface. For avoiding joinings in the cloth, it is woven in peculiarly constructed looms, by which perfect pieces can be turned out, of the following dimensions, which are those most generally required—namely, 100 yards in length by 6 yards in breadth, 108 yards by 7 yards, and 113 yards by 8 yards.

The canvas generally retains the same width throughout the subsequent operations; but it is cut into pieces varying from 60 to 100 feet in length, each of which is stretched over a vertical frame, to which its four corners are hooked, rendering it almost as tight as a drum. Here the canvas remains many weeks, during most of the processes.

The first stage of the proceeding consists in preparing the surface of the canvas in order to render it smooth and durable. For this purpose a wash of melted size is applied to each surface, and, while wet, well rubbed with a piece of flat pummice-stone. When the size has dried, the painting commences. The paints employed are those of the common description, with this exception, that they are much thicker and stiffer, and have but very little turpentine added to them. The first layer of paint is dabbed on in patches here and there with a brush, and then levelled and spread by means of a trowel, twelve or fourteen inches in length. Ten or twelve days are allowed for this thick coating to dry, at the expiration of which a second one is laid on thinner than the former, and applied wholly with the brush. These two layers are all that are required for the back surface; but the front one requires a greater number of coatings and more processes, such as a rubbing with pummice-stone after each successive layer. Two or three more coats of paint will, in general, suffice for this surface, by the time it has received which it will have acquired a great degree of smoothness, and the substance altogether much suppleness and pliability.

The pattern is the next point to be considered. For this purpose wood blocks are employed in much the same manner as those for paper-hangings and colour printing. The canvas is first removed from its vertical position in the frame and then wrapped round a roller so placed as to allow the canvas to be uncoiled and spread out on a table to be printed. The blocks (which we will suppose to be four for one pattern, namely, red, yellow, blue, and green) being ready, the paint (say red) is applied with a brush to the surface of a pad or cushion formed of flannel covered with floorcloth; the block, held by a handle at the back, is placed face downwards on this cushion, and the layer of paint thus obtained is transferred to the surface of the canvas by pressing the block smartly down on the latter. A second impression is made in a similar manner, by the side of and close to the first; and so on throughout the length and breadth of the canvas; each impression being about fifteen inches square. The proper "register" of the succeeding impressions is assisted by pins placed at the corners of the blocks. When the whole surface is thus printed with one colour, all the other three are similarly applied in succession. Where more colours occur, more attention to their "register" is, of course, requisite, in order to effect the proper arrangement of the whole.

In printing floorcloth for passages and stairs, where the cloth seldom exceeds a yard, the canvas is prepared in the frames, as in the other cases, but it is cut up into strips before being printed, and has usually a border given to its pattern by means of blocks, much narrower than the ones mentioned above.

Where there are large patches of one colour in the pattern of floorcloth, they are not given by smooth surfaces on the blocks, but by means of little projecting squares, technically denominated "teeth," the reason for which is, that if a surface two or more inches square were laid on wet paint, it would not take up the paint equally, but would exhibit it in an unequal splat; whereas, if the surface were broken up into a number of smaller surfaces by means of lines cut in various directions, these lines would act as air-vents, and the paint would be taken up pretty equally by the little squares or "teeth."

Value of Material.

In estimating the cost of any article, there are two essential elements to the calculation, viz., the value of the raw material from which the article is produced, and the amount of labour expended upon the raw material before the required article is completed. It becomes a very interesting inquiry as to the proportions in which raw material, representing a certain value and labour, unites to make up the value of objects of art and manufacture.

In pursuing this inquiry it will be very soon perceived that in many cases the original value of the material bears but a trifling, in some a totally insignificant relation to the value of the ultimate result; while in other objects of great utility and extensive consumption, the value of the article is but little raised above that of the raw material from which it is produced. There are two causes for this: first, the material itself may, like gold, possess a high value *per se*. Secondly, a material itself of small value may be subjected to an extreme amount of manipulation in the course of manufacture, or it may possess certain physical properties by which the necessary manipulation, not excessive in itself, is rendered hazardous or difficult. It must be evident, in carrying this principle to its full legitimate extent, that the value of any commodity in money represents nothing more than the labour which has been expended in obtaining or producing it: for where the worth of an article is calculated from the cost of the raw material, and the labour of converting this material, it must be obvious that we are only, in the latter case, varying the form in which value, as the representative of labour, is put forward; for the price of the raw material itself is wholly governed, directly or indirectly, by the labour expended in its production. In a very few and especial instances the pecu-

liar qualities of a material may, in some degree, affect the question of value; but these are remote exceptions, and do not alter the general conclusion. The increased value of any substance arising from its comparative scarcity, as gold, platinum, and precious stones, must always ultimately be brought to the labour standard in fixing their worth, as their high price is the consequence of the great expenditure of labour required to seek for and obtain such materials.

As a rule, it will be found that the proportion which labour bears to raw material in fixing the value of an article, is greater in the case of raw materials of small than in those of great value. Thus lead, copper, iron (cast and wrought), hemp, and flax, can all be endued with comparatively greater labour-value than gold or silver, that is to say, the labour exceeds the value of the raw material much more in the former instances than in gold or silver; and with these two the balance of the labour-value is again on the side of the least costly material.

To illustrate this position, let us suppose a quantity of raw material, worth in each case £1, to be manufactured as follows, the result would be very nearly—

	£
LEAD:—	
As sheets	1·32
Small printing type	30·00
COPPER:—	
Household utensils	4·92
Fine metallic cloth	53·00
IRON (CAST):—	
Ornamental	48·00
Ornaments for the person (Berlin)	148·00
IRON (WROUGHT):—	
Twisted gun barrels	240·00
Penknife blades	650·00
Polished steel buckles, &c.	900·00
Needles	70·00
Scissors (finest)	450·00
Sword handles (polished steel)	980·00
HEMP:—	
Cordage and cable	4·00
FLAX:—	
Linen	5·00

These figures prove that it is the least valuable raw material *per se* which is most susceptible of receiving a largely increased value by means of labour, and this will be more apparent if we consider that gold is rarely doubled in worth by any manipulation which can be bestowed upon it; and that, generally, in the price of gold articles, the labour element is greatly below that of raw material in worth.

Of all the instances, however, which could be brought forward to illustrate the relation which raw material and labour bear to each other, there is none more striking and conclusive than can be found in the manufacture of articles from steel. Referring back to the figures given above, it will be seen that in every branch of steel manufacture quoted, the raw material value is exceeded by the labour-value in a very remarkable manner, the latter being in two cases 900 and 980 times greater than the former. There is no other raw material which is capable of having its value thus enhanced by labour; this doubtless arises from the fact that steel possesses properties which are wanting in every other substance, and which are just the properties which render it, and it alone, applicable to certain purposes in the arts. So much is this the case, and in such an eminent, nay, even astonishing degree does steel possess the power of receiving value from manipulation in the arts, that the cases already mentioned give but a faint idea of the extent to which this accession of value may be carried.

In producing springs for a smaller description of watch the increase of labour is enormous. There are three sizes of wire in general use in producing these springs. Specimens obtained from the manufactory of Messrs. Lambert, Oxford Street, Islington, are numbered respectively 42, 54, and 70. No. 42 is the kind from which the ordinary springs already spoken of are made. The other sizes are much smaller, No. 70 being absolutely minute. The price of No. 42 to the trade is 1s. per yard, the weight of which is 36-100ths of a grain. Consequently, 1 oz. of wrought iron, the value of which does not exceed 1-8th of a penny, converted into steel, and drawn into this fine wire, will produce 1,320 yards, worth £66. The second size, No. 54, is worth 2s. 6d. per yard to the trade, the increase of value being due to the additional labour and time required to reduce No. 42 to this smaller size. The weight of a yard of No. 54 is only 21-100ths of a grain. One ounce of steel would therefore draw into 2,200 yards of wire, the value of which is not less than £275; the worth of the raw material not, it must be remembered, exceeding 1-8th of a penny.

The third and smallest size of wire, No. 70, is only employed in making the springs of very small watches, such as are set in bracelets, more, indeed, objects of curiosity than use. The price of this wire is 20s. per yard, the increase of price being again only due to added labour, as the wire is in every case originally the same. There are but few workmen who possess sufficient skill to draw this wire; it weighs only 16-100ths of a grain per yard. One single ounce of steel would therefore draw into no less than 3,320 yards, or 1 mile 1,560 yards, or nearly two miles, having the almost incredible value of £3,320 per oz. In the state of steel wire of this extraordinary fineness, an ounce of wrought iron is worth as much as 830 ozs. of pure gold, at £4 per ounce; or 13,280 ozs. of silver, at 5s. per ounce.

As the value of the raw material was only 1-8th of a penny, it follows that the enormous price of the wire is due solely to the worth of the labour bestowed upon it. The value of the labour element in this case exceeding that of the raw material by upwards of six millions of times.—*The Artizan.*

MORSE IVORY.

The morse inhabits all parts of the Icy Sea; and its upper canine teeth, or tusks, are at times nearly two feet in length and of great thickness, weighing occasionally full 30 lbs. The pulp cavity occupies about a fifth of the entire length of the tooth; the ivory is composed of delicately interwoven fibres of a very fine white colour, covered with a hard rugose enamel. The core, or inner part of the tooth, has a peculiar crystalline appearance, and is of an oily yellowish hue. Morse ivory is easily distinguishable from that of the elephant by the three distinct layers of material of which it is composed, by its central crystalline core, by the absence of the intersecting curves resembling "engine turned" articles, which characterise the elephant's tusks, by its greater hardness, and also by its retaining its white appearance much longer than elephants' ivory does. The morse tusks which we receive from the Esquimaux are generally so soaked with oil that the pristine colour cannot be detected.—*H. S. Cuming.*

Heraldic Blazon.

(*Continued from page* 47.)

Charges are the contents of a field, and are distinguished as honourable ordinaries, subordinaries, and common charges. The honourable ordinaries are formed by the employment of the lines already figured in this treatise, and are named the chief, bend, bend sinister, fess, bar, pale, cheveron, cross, and saltier.

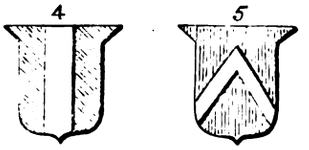
The chief (fig. 1) occupies exactly one third portion of the field, at the top, and may be accompanied by a fillet one-fourth of its own breadth, as represented. The chief is always formed by a horizontal line, either straight or crooked, and may be charged with figures.

The bend (fig. 2) is a stripe passing diagonally across the shield from the dexter corner.

The bend sinister,* of course, is the reverse of the preceding.

The fess (fig. 3) is a horizontal stripe drawn across the centre of the shield, and being one-third of its depth in breadth.

The bar is very similar to the fess, except that it is not confined to any particular part of the shield. A number of bars may also be displayed on the same field. "When the shield contains a number of bars and metal alternate, of even number, that is called *barry* of so many pieces, expressing their number." The bar is only one-fifth of the depth of the shield.



The pale (fig. 4) is just the same as the fess, only being perpendicular. It occupies the third part of the escutcheon. The pale, reduced to one sixth part of the shield, becomes a pallet, and half of that again, an endorse. In some cases, all three are displayed on the same field.

The cheveron (fig. 5) resembles a pair of rafters. It occupies the fifth part of the field. Its diminutive is the cheveronel, which is half its size.

The crosses used in heraldry are very numerous—indeed, almost too numerous to count. "The principal and most usual varieties of this ordinary," says Lower, "are described in the 'Boke of St. Albans.' One of the most interesting forms is the cross fitchée, or 'fixibyll' (fig. 6), because being sharpened at the lower end, it could be fixed into the ground, like the little crosses in Catholic cemeteries. It probably originated in the cross anciently carried by pilgrims, which answered the purpose of a walking staff, and served when occasion required for the use of devotion. Next to this may be reckoned the cross patée (fig. 7), the cross-crosslet, the cross patonce (fig. 8), and the cross moline" (fig. 9).

Fig. 10 is the calvary cross.

(*To be continued.*)

* "It is a prevailing error that the bend sinister is a mark of dishonour, as betokening illegitimacy; this seems to have arisen from its having been confounded with the bâton, which bearing differs from it both in being much narrower, and in being cut off from the borders of the escutcheon."—*Lower's "Curiosities of Heraldry."*

Modern Greek Alphabet.

A	α	Alpha	a
B	β	Bēta	b
Γ	γ	Gamma	g (hard.)
Δ	δ	Delta	d
E	ε	Epsilon	ĕ (short.)
Z	ζ ʒ	Zēta	z (sd.)
H	η	Eta	ē (long.)
Θ	θ	Thēta	th
I	ι	Iota	i
K	κ	Kappa	k
Λ	λ	Lambda	l
M	μ	Mu	m
N	ν	Nu	n
Ξ	ξ	Xi	x
O	ο	Omicron	ŏ (short.)
Π	π	Pi	p
P	ρ	Rho	r
Σ	σ ς	Sigma	s
T	τ	Tau	t
Υ	υ	Upsilon	u
Φ	φ	Phi	ph
X	χ	Chi	ch (hard.)
Ψ	ψ	Psi	ps
Ω	ω	Oměga	ō (long.)

The following characters are also sometimes used:—

ϐ, ſ, ϑ, ϖ, ϱ, and ϛ, ϋ,
for β, γ, θ, π, τ, and στ, ου.

CORRESPONDENCE.—"R. W." (Preston). All in good time; but such things as you refer to take much longer to select or design, draw, and engrave, than you imagine. Therefore, never ask "the favour" of a large engraving in "the next number," or even "the next but one." The idea is preposterous to us who are deluged with similar applications; but we shall keep in mind the subject you allude to.

Colour in Decorative Art.

(*Continued and concluded from page* 48.)

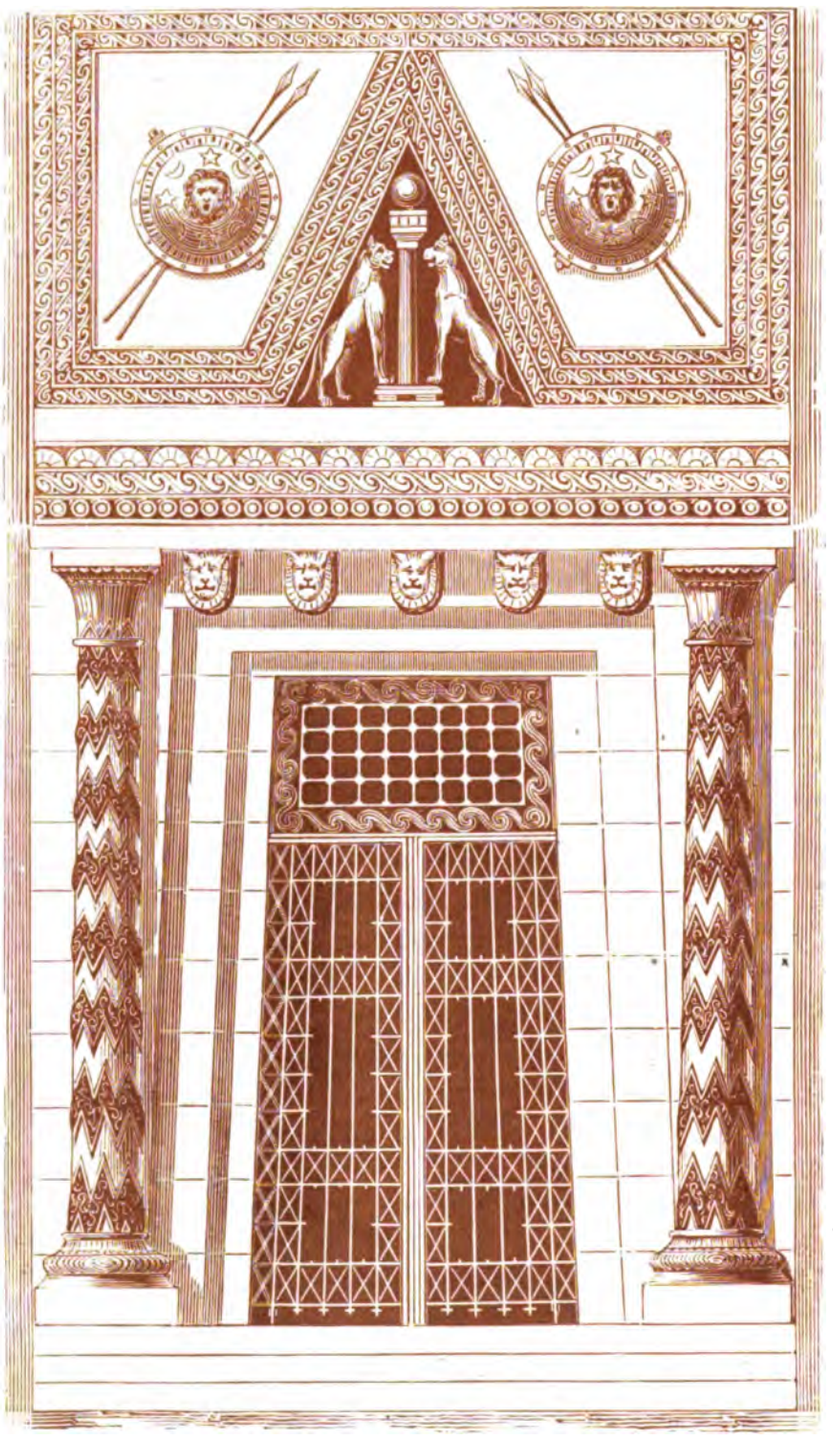
"In many of the above examples, gilding has been profusely employed, but owing, I imagine, to the various lights, reflections, and variety of effect, it receives, gilding appears to be exempt from the laws that affect other coloured materials, and may be used in any quantities, and harmonises with all colours; although from its brightness it would appear to be unsuited to the purpose, gilt frames are found to harmonise with every variety of pictures, better than any other kind. The churches of our own country have so suffered from wanton violence or bad taste, that it is difficult to name any examples, though in some of the cathedrals which have escaped the flat monotonous washes of tasteless innovators, the beauty and the solemnity of the broken hues of the stone and carved wood-work may be studied, and the value they give to the rich coloured glass; I cannot add pictures, mistaken zeal having in most instances banished them from our churches. Of this effect, were it not for the glaring inharmonious white marble modern monuments, Westminster Abbey would be a splendid example. The recent introduction of monumental windows will, if generally adopted, save the walls of our churches from being covered with monuments of different style to the building, and add colour where it is much wanted. In the painting of them the arrangement of colour in the ancient specimens should be adopted; these contain no large masses of colour as in modern glass painted windows, and the figures, &c., were not regarded as pictures, but made subservient to the general ornamental arrangement of colour in the window. The objections to the removal from Westminster Abbey of some of the monstrous monumental absurdities, consisting in the reverence for the memorials of departed great men, and regard for the feelings of their living representatives, might be obviated by the substitution of monumental windows. The same rich combinations of subdued broken colours may be found in some of our collegiate halls, or remaining residences of the olden time, and are generally assisted and heightened by pictures and stained glass. At St. Denis, near Paris, the positive colours are profusely used, and the altars, pictures, stained glass, and painted statues, are sacrificed in consequence. The French, in their modern decorations in general, support and relieve the positive colours by delicate or rich subdued hues; at St. Vincent de Paul, the low-toned marbles of the columns occupy a large proportion of the composition, and are supported by carved oak-work. The historical and other pictures with which many of their ceilings are decorated, appear oppressive and unsuited to their place. In such situations the beauties of fine works of art challenging much attention, are lost from the difficulty and painful position necessary to view them, and if richly coloured with full positive colours and deep tones, appear heavy and overpowering, and lower in appearance the height of the apartments. Subjects for ceilings should be of light fanciful character, and painted with the lighter delicate bright tints and subdued hues. If the same class of colours are employed in the general decoration of ceilings, domes, arches, soffits, &c., and the positive colours necessary to prevent tameness of effect moderately employed, height and space, an important beauty in architecture, will be obtained. The beauties of Rubens' fine work at Whitehall Chapel are comparatively lost in its present situation. That the combination of varied hues and subdued colours excites the admiration of mankind, we have convincing proof in every exhibition and picture-gallery; where buildings are chosen as subjects in themselves, and not as secondary backgrounds to other objects, it is not the newly-erected edifice with its flat unbroken tints, but the older constructions with their time-stained walls, ruins to which the weather and mosses have given every variety of varied hue, cottages often possessing no beauty of form, and deriving all their charms from the rich variegated colours painters delight in. That this admiration is not confined to the English and their artists, many of the works of the Flemish painters are a proof. Painters select subjects from the lower classes of all countries, as much for the varied broken hues of their old worn dresses, as for any other picturesque quality. The beauty of subdued colours may also be seen in the Greek fictile vases."

Technicologia.

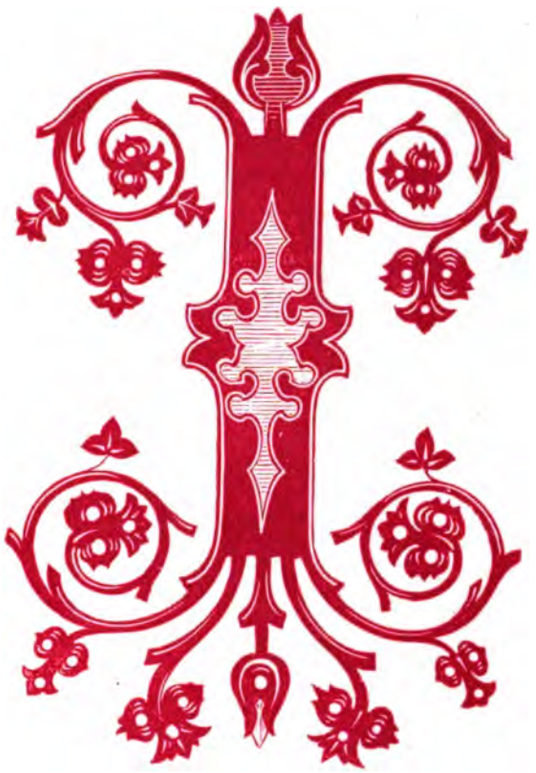
139. *To take Impressions from Metal and Stone Seals.*—Warm the seal a little by holding the face of it near the side of a candle; make it so as you can just feel it warm against your face. Then take the stick of wax and hold it above the candle, that the end of it may be melted without burning; apply it to the letter, and stir it to the required shape. Press the warm seal down quickly while the wax is tolerably hot, let it remain a few seconds, and remove it carefully. Metal seals require to be made warmer than stone. *To produce the Dead Surface, as in Proof Impressions:* Warm the seal, take a *soft* plate brush, and rub it in a little olive oil; brush over the warm seal with it by sticking the ends of the hair on the face of the seal; then dip a good sized pencil brush in the best Chinese vermilion, and tap it lightly on the greasy seal; blow off the loose vermilion from the seal, melt the wax, and seal as above.—*T. Moring.*

140. *Density of Alloys.*—The following possess a density *greater* than the mean of their constituents: gold with antimony, bismuth, cobalt, tin, or zinc. Silver with antimony, bismuth, lead, tin, or zinc. Lead with antimony. Platinum with molybdenum. Palladium with bismuth. Copper with bismuth, palladium, tin, or zinc. The following, on the other hand, possess a less density than the mean of their constituents:—gold with copper, iron, lead, iridium, nickel, or silver. Silver with copper or lead. Iron with antimony, bismuth, or lead. Tin and antimony. Lead and palladium. Nickel and arsenicum. Zinc and antimony.—*Thénard.*

141. *To Dry Plants and Flowers.*—A correspondent of the "Floral World," says that he has practised the following method for his *hortus siccus* with complete success for from twenty to thirty years:—Prepare several tablets of plaster of Paris of the size of the book in which you intend to mount your collection; they should not be less than an inch in thickness. The plaster should not be mixed very strong. The lighter they are, the more absorbent. When they are thoroughly dry, lay the blotting-paper on the plaster, then the plant, covering it with more paper, and then plaster slab, plant, and so on, forming a pile. The plaster absorbs the moisture from the paper so rapidly as to hasten the process and thereby preserve the colour. Before the tablets are used again the moisture must be carefully evaporated—not exposing them to greater heat than the hand will endure.



GATE OF THE TREASURY AT ATREE, AT MYCENÆ, A TOWN OF ARGOLIS, IN GREECE—AS RESTORED.



INITIAL LETTERS.

Fresco Painting.

THE art of colouring in fresco is an imperishable monument, which will at all times exhibit to posterity the wisdom and profound knowledge of the ancients—qualities which enabled them not merely to lay the foundation of the arts and sciences, but also, in very many cases, to so far perfect them as to leave to after generations merely the power of imitation. The specimens of this style of decoration which are deposited in the British Museum and other places, are, no doubt, familiar to most of our readers as the most brilliant, fresh, and imperishable efforts of the art of colouring ever executed by the hand of man:—in them the colours literally glow, and what in more modern pictures bear a time-decayed and musty aspect, there rather seem to improve by the lapse of ages.

Professor Hess recommends as the best materials for constructing walls well adapted for fresco, well-dried bricks of an equal hardness. The use of laths is sometimes necessary; but a brick ground is preferable wherever it is practicable to construct one, on account of its solidity and adaptability. It absorbs superfluous water, and keeps the plaster longer in a fit state for painting upon. The painting ground dries much quicker on laths, as two surfaces are presented for evaporation. The walls ought to be thoroughly dry. A wall of a brick, or a brick and a half in thickness, is best suited for painting on.

But the London bricks are highly charged with salts, which exude every time the wall is moistened or damped, and will effloresce upon the surface of the picture—an evil which has been encountered by many artists. To prevent this, a hydrofuge of wax, resin, and oil should be spread over the wall previously to laying the ground for fresco, by which the damp would be intercepted; but the safer plan would be, to use battens and laths instead of the brickwork; this mode receives additional recommendation from the fact, that none of the experimental frescoes painted upon such a framework have shewn any of the defects which would result from salts or from damp. Where great lightness or removeable frescoes are required, a frame of wood, with wirework of either iron or copper, could be used, instead of the laths; and the Italians have a method of preparing coarse canvas protected by laths at the back, which has a great advantage in this respect over the others.

If a brick or stone wall be selected to paint upon, it will require to be thoroughly dry before laying on the rough coat of plaster. This first layer is composed of river sand and lime in the proportions of two parts of sand to one of lime, or three parts of sand to one of lime. The thickness of the coat is such as is generally used in preparing the walls of dwelling-houses. The surface of this first application should be rough, but not unequally so; and the mason should avoid leaving cavities in it.

The wall thus coated should be suffered to harden perfectly: the longer it remains in this state the safer it will be, especially if the lime used was, in the first instance, fresh.

The ultimate preparation for painting on the dry, hard, well-seasoned mortar, is as follows:—The surface is wetted again and again, with boiled or rain water, till it ceases to absorb. Then a thin coat of plaster is spread over that portion only which is to be painted; the surface of this coat should be but very moderately rough. As soon as it begins to *set* (in ten minutes or so, according to the season), a second thin coat is laid on somewhat *fatter*, that is, with more lime and less sand (*i. e.*, two parts or less of sand to one of lime). Both these layers together are scarcely a quarter of an inch thick. The plaster is laid on, and the surfaces are smoothed with a wooden trowel: this, at least, is Cornelius's practice. Some painters like the last surface (which is to receive the fresco) to be perfectly smooth; and sometimes substitute marble-dust for the sand; but this does not work so pleasantly as the sand, and is, to some eyes, disagreeably white. One of the modes of rendering it slightly rough, is to fasten some beaver nap to the trowel; another is to pass over the plaster, in all directions, lightly with a brush.

(*To be continued.*)

On the Method of Painting practised in the Ancient Venetian School.*

By T. SHELDRAKE.

The method of painting practised in the Venetian School, I conceive to have been as follows:—

The cloth was primed with colours in distemper, of a brownish hue, such as would properly enter into the darkest parts of the picture. The most transparent colours are the properest. I believe umber was most generally used, broken with red, yellow, or blue, according to the tint intended to be produced, and diluted with chalk or whiting to the proper degree of strength. Upon the ground so prepared, the subject was correctly drawn with umber, pure, or mixed with lake, blue, or black; and, with the same colours, those shadows that were darker than the ground were then painted in.

The artist then painted the lights with *pure white*, in a solid body, where the light was brightest, or where the full effect of colour was to be produced; and, where the demi-tints were afterwards to be, scumbling it thinner by degrees, till it united with the shadows.

In this manner the chiaro-oscuro was finished as much as possible, and the local colour of every object in the picture glazed over it. All the colours used in this part of the work were ground in oil, which was absorbed into the ground, the picture remaining flat, something like a picture in water-colours or crayons; it was then varnished, till saturated with varnish, and the full of every colour brought out: the picture was then complete.

Upon the most superficial view of this process, it will be evident that a picture painted by it is, as to all visible properties, a varnish picture; for the small quantity of oil that had been used sank into the ground, and never could rise again to be hurtful: while the

* Reprinted from the "Transactions of the Society of Arts," vol. xvi.

varnish, being laid on after the colours, gave them all the brilliancy and durability they could derive from that vehicle, without being liable to the objections that are made to painting in varnish, supposing it to be used in the same manner as oil is in painting with oil. It is true that this mode of painting is itself liable to some objections; these I have endeavoured to obviate, and shall therefore mention hereafter. Here it may be observed that, as any varnish may be used, it is to this circumstance we must attribute the different degrees of durability in pictures of the Venetian School. I have seen some that would resist the most powerful solvents, while others were destroyed by the weakest; though all possessed the apparent properties that distinguish the Venetian pictures from all others.

As I do not pretend to degrade painting to the rank of a mechanical art, that may be infallibly practised by a recipe, I shall be permitted to observe, that this was the general system of the Venetian School, which I have seen variously modified in the works of different artists of that, as well as of the Flemish, which is derived from it. It is susceptible of an almost infinite number of modifications, in proportion to the talents, the judgment of, and the objects to be painted by, the artist who may adopt it. This being the case, if it is proved by experiment that effects similar to those of the Venetian pictures may be produced by this method, and that the system has a strong tendency to produce that brilliancy, and harmony of colouring that is so much admired, with more certainty and facility than those qualities can be obtained by any other mode of painting, I hope my case will be proved to the satisfaction of the Society.

I once asked Sir Joshua Reynolds, by what circumstances in the management of a picture he thought the harmony of colouring was to be produced? He replied, an unity of light and an unity of shadow should pervade the whole. He explained to me the difficulty of reducing the various colours of all the objects that may be included in a picture, and the various modifications of those colours to the simple, harmonious state he described, and illustrated what he had said by this simile.

"A picture, to possess harmony of colouring, should look as if it was painted with one colour (suppose umber and white), and, when the chiaro-oscuro was complete, the colour of each object should be glazed over it."

This observation, from such authority, was impressed with peculiar force on my mind; and if I can retrace its operations on a subject which has so long engaged my attention, I should say Sir Joshua's observation was the clue that guided me through all my experiments, and, I hope, will enable me to prove, that the beautiful and simple practice which he suggested as a simile, was literally the practice of that school upon whose works his ideas of colouring were founded. At the same time I may observe, that the fact seems to have eluded his observation, or he would not have used it as a comparison to simplify his description of a practice which he thought both difficult and complex.

In the Newtonian doctrine of Light and Colours, it is believed that all colours are inherent in light, and are rendered visible by the action of various bodies, which reflect particular rays, and absorb the rest. Without disputing the truth of this doctrine, it is to be observed that a painter must consider the objects he represents as being analogous to the materials he uses to represent them; and, in this view of the subject, colour is to be considered as a property inherent in bodies which is rendered visible by the contact of light, a colourless, or at least a mono-coloured substance, and shadow the mere privation of light.

A picture may represent either a group of figures, or other objects, in a room, or any objects in the open air: whatever the situation may be, it represents certain objects in a given space, possessing individually their peculiar colours, and generally exposed to the operations of light. The quantity of light each can receive must depend upon its form, and its position respecting that part whence the light comes; for, in proportion as other parts recede from the light, the shadow becomes visible: but shadow is nothing but privation of light, and privation of colour, in proportion as the light is diminished. Some attention to these circumstances will, perhaps, enable us to demonstrate the truth of Sir Joshua's position.

If a globe of one colour be exposed in a painter's room, properly darkened, that part which is nearest the light will partake of its colour; the next part will shew the true colour of the object: that which first recedes from the light will be a little obscured, the next a little more, and so on progressively, till that part which is farthest from the light will lose its colour, and appear equally dark with the shadiest part of the room. Now we know this globe is of one uniform colour; the variations we see in different parts of it are only deceptions, occasioned by the accession of light in some parts, and the privation of it in others.

What is true of this one object and its parts, would be equally true of any number of objects, whatever their colours or relative situations might be: if they were placed together in the same room, each would possess its own individual colour, each would partake of the general light, in proportion to its situation, and of the general darkness in proportion as it recedes from the light. All this may be easily conceived; but the difficulty, and in the ordinary modes of painting a serious one it is, is to represent such objects with the appearance of truth, and preserve the harmony necessary to constitute a whole. The Venetian painters, however, by whatever means they obtained their knowledge, discovered a method so simple, that perhaps no other can produce such brilliant effects, and undoubtedly not with facility and certainty at all comparable with theirs.

The artist will remark that, in describing the whole of the Venetian method of painting, I have said nothing of the manner of producing those demi-tints which conduce so much to the brilliancy of a picture, which are so difficult to execute, and in which he most frequently fails. Those tints are, in the ordinary modes of painting, produced by the mixture of black, grey, blue or brown (according to the judgment of the artist), with the local colours of the objects. It is these tints which, from their being made with such colours, it is difficult to get clear, and which never are so clear in any other as in the Venetian, and in some of the Flemish pictures, which are painted upon analogous principles. The fact is, that those painters produced all such tints without the admixture of any colour to represent them, and by a method so like that by which they are produced in nature, that this circumstance alone ensures a degree of brightness to their colours, and of harmony to their shadows, that it is perhaps impossible to produce, in an equal degree, by any other mode of painting.

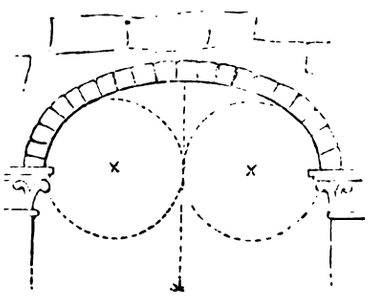
(*To be continued.*)

Architectural Glossary.

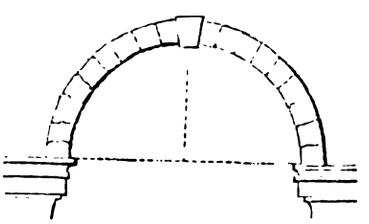
(*Continued from page* 43.)

ARCH (Latin, *arcus*).—A segment of a circle, restricted to not more than half. It is generally an aperture formed of bricks or stones of a wedge-like tendency, by which it is adapted to resist perpendicular and lateral pressure, so as to support the edifice built over it. An opening in a bridge through or under which the water or vessels pass. A concave ceiling or floor of any material or on any principle of construction. A tunnel or excavation. The following are illustrations of some of the various forms of arches at present in use.

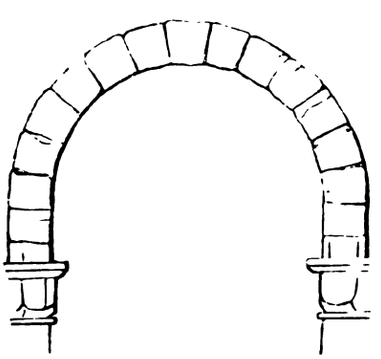
1. *Elliptical.*



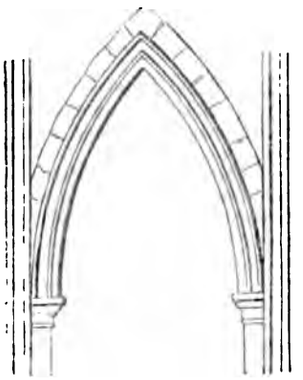
2. *Semicircular.*



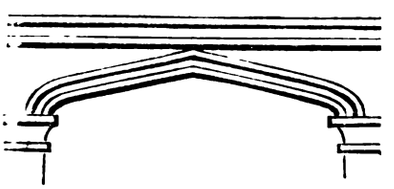
3. *Horse-shoe.*



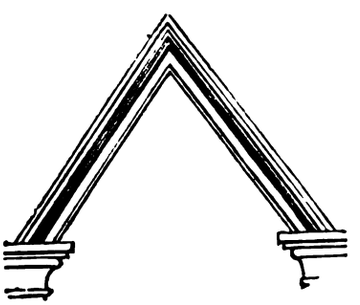
4. *Gothic or Pointed.*



5. *Straight.*

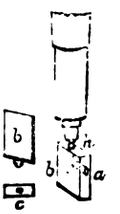


6. *Triangular* (*Saxon*).



(*To be continued.*)

CORRESPONDENCE.—*Glaziers' Diamonds.*—"Ph. K." (Northampton).—The part of the diamond used for cutting is of a tapezoidal shape. The patent diamond of recent invention is represented in the annexed figure. The peculiarity consists in the diamond being set in a parallelopiped shoulder, *b b*, the right angle of the lower end of which is cut off, and forms the correct angle at which the diamond when set will cut the glass. The upper end of the shoulder swivels at A, but it is stopped from going too far by the screw *a*. The object of this is to prevent the necessity of shifting the handle in the hand when placed against the ruler laid on the glass. The lower end of the shoulder, shewing the diamond, is represented at *c*. The diamond is usually about the size of an ordinary pin's head, and is set in a nipple of brass or copper.—For the cement, try lime and white of eggs mixed.



ERRATUM.—The inscription under the illustration following p. 52 *ante*, should read, "Gate of the Treasury of Atreus," *not* "Gate of the Treasury at Atree."

Technicologia.

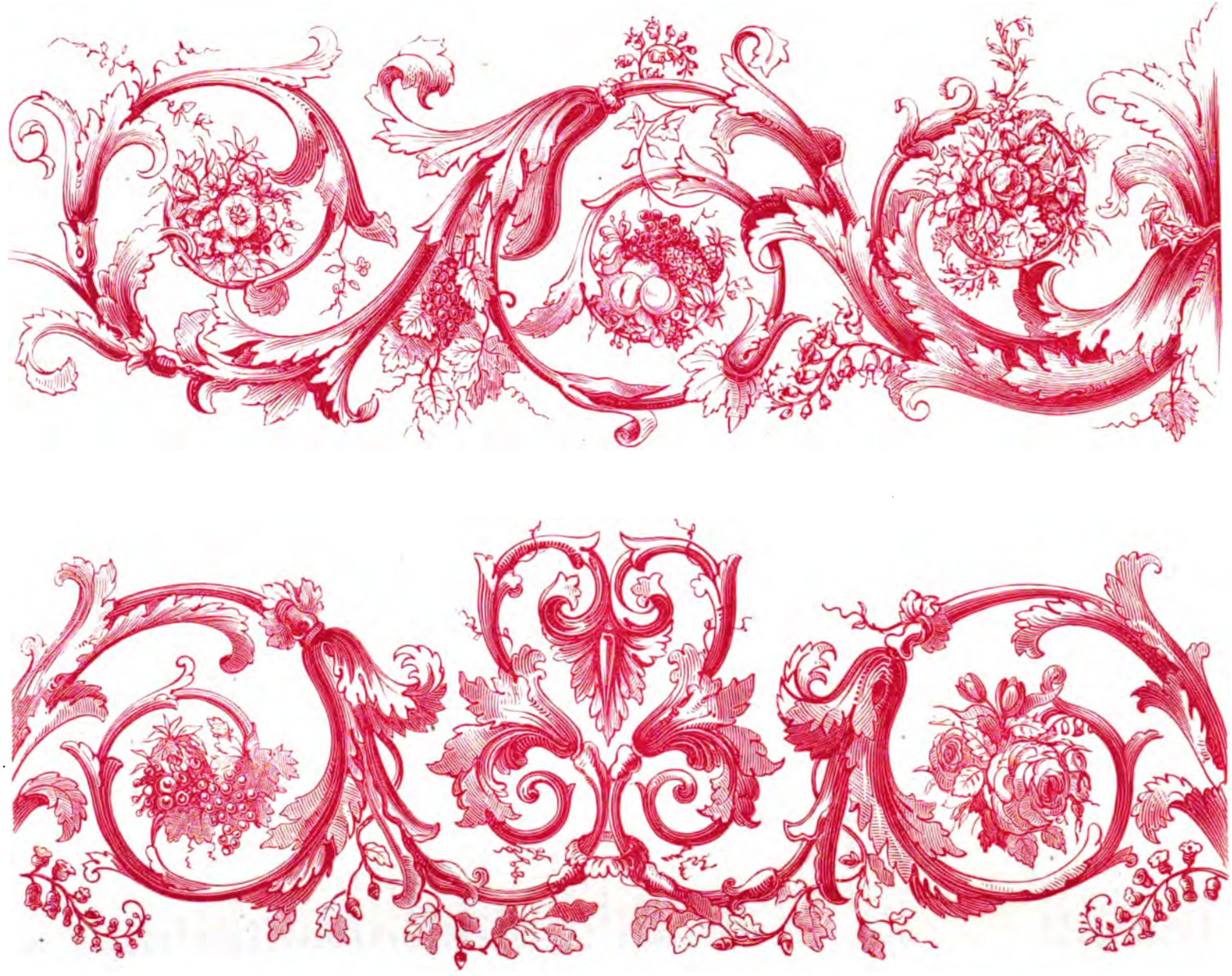
142. *To Cast from the Interiors of Shells, &c.*—Pour a soluble alloy into the cavity, and then corrode away the shell with hydrochloric acid. The metal model may be multiplied by plaster casts.

143. *To Smoothen and Polish Ivory.*—Some painters use a large scratcher, others an instrument with a blade three or four inches long and of a triangular shape. To either of these the use of a razor is preferable; to benefit completely by it, be sure that it has not the slightest notch on its edge, and observe that it is not too sharp. Open it so that the back part of the blade touches the handle, and in that position use it to scrape the ivory from angle to angle. When the whole is thus smoothened begin again from the contrary angles, in order that no traces of the saw may remain upon the side required to be painted. Having provided some putty powder, pulverised and passed through a silk sieve, place the ivory in the middle of the bottom of a bandbox, holding it firmly in one hand, while with the other take a small bit of paper, and rub the pounce on the side of the ivory which has been polished—being always careful to do it with a circular movement. If the ivory be now of a dead white, and has lost the lustre given to it by the razor, take it out of the box, holding it so that the fingers do not touch the surface, and brush off lightly with a painting brush any grits that may have adhered to it. For this purpose take one of the largest hair pencils. It may be serviceable to remove in the same way any specks or dust while painting. Never suffer the fingers to touch the ivory; hold it always at the extremities, for the colour will not settle in a place touched by the hands. If, however, such an accident happens, have recourse to the pumice powder, and with a paper stump, rather pointed, gently rub the place affected. But to avoid as much as possible a recurrence of such accidents, when at work, take a sheet of paper to rest the hand upon, and when there is occasion to use body colour, have a piece of wood or pasteboard made for the same purpose, in such a way as not to touch the miniature, for in consequence of the gum which is in the colours, the heat of the hand might cause the paper to adhere to the painting.

144. *To make Works in Tortoiseshell.*—Before the shells are worked they are often dipped in boiling water to *temper* them; three or four minutes commonly suffices, but they require a longer period when they are either thicker or more brittle than usual: excess of boiling spoils the colours of the shells, renders them darker, and covers the outside with an opaque white film. Others flatten and temper the shells with hot irons, such as are used by laundresses; the shell is continually dipped in cold water to prevent its being scorched; but as a general rule, the less tortoiseshell is subjected to heat, or to being pulled about, the better, as from its apparent "*want of grain*," or fibre, it becomes in consequence very brittle. Many of the works in tortoiseshell are made, partly by cutting them out of the shell, and partly by joining or adhesion, called by the French *souder*. Thus in the "Manuel du Tourneur," the artist is directed to form the ring of tortoiseshell for the rebate of a box, by cutting out a long narrow slip of the shell; the ends are then to be filed, with a clean rough file, to thin feather edges to the extent of three-quarters of an inch of their length, the one on the upper and the other on the lower surface, to constitute the lap or joint; the slip is dipped into boiling water, and when softened it is bent into an oval form with the intended joints on the flat side; the ends are held in firm and accurate contact with the finger and thumb, and the piece is dipped into cold water to make it retain the form. A pair of tongs is required, with flat ends measuring about one inch wide and three or four long, and that spring open when left to themselves, but fit perfectly close and even when compressed: these are made warm.—*Holtzapffel.*

DRAWINGS OF THE OLD MASTERS.

The following passage from Dr. Waagen's "Works of Art and Artists in England" is interesting, as exemplifying both the patient study and dexterous adaptation of the means and instruments of their art evinced by the elder painters:—"The drawings of the great masters have a peculiar charm. By them more than by works of any other kind, you are introduced into the secret laboratory of art, so that you may follow a painting from the first germ, through its various stages and changes, till it attains its perfect form. Mr. von Rumohr with his usual refined sense of art, directs our attention to the sure mechanical taste with which these old masters always employed in their drawings the material which was best adapted to the object they had in view. If they wanted to sketch upon the paper a first thought just as it arose in the fancy, they usually chose the red Italian chalk, with which sketching is so easy, or the soft Italian black chalk. The breadth and softness of the strokes immediately gives to such a first sketch something picturesque and massy; and, at the same time, the material allowed of further finishing, in a high degree, if it were desired. But if they wished to arrest a rapidly passing effect in Nature, as it was fresh in their fancy, to seize an accidental happy, quickly changing cast of drapery, or to mark sharply and distinctly the main features of some character, they preferred the pen, which allowed them to unite the easy flowing line with the sure and distinct indication of the forms. If they desired in the portrait, in a study, in the composition, to express the most delicate movements of the forms, the fine play of the surfaces lying within the outlines, they generally took a rounded silver pencil. On paper covered with a mixture of white lead and pale yellow ochre, verdigris, or some red, such as pencil marks, but lightly and softly, and, therefore, allows of changing and improving *ad infinitum*, and by leaning harder, at length to mark decidedly, among all the others, the design in favour of which the artist has determined. If they wished to decide on the main distribution of light and shade, the full camel's hair pencil dipped in sepia or Indian ink, with its elastic point, its bold fulness, led the most rapidly and surely to their object. In such drawings, the outlines of the forms are often not marked, but result only from the limits of the shadows: when it was required, at the same time, to mark the form, the use of the pen was added. Lastly, for a more detailed marking of light and shade, coloured paper afforded them a middle tint, by the help of which they produced with black chalk in the shadows, and white in the lights, a very delicate gradation and a great relief of the parts. On account of these many advantages, this mode of drawing has been very commonly used."



FRIEZES—ITALIAN.

SCROLL.

Fresco Painting.

(*Continued from page* 53.)

PROFESSOR HESS recommends avoiding the intermixture of plaster of Paris in the mortar for the first rough coat (in the finer coats it is never employed as a preparation for fresco), and advises a moderate use of small flint pebbles. The rough coat should not be too compactly laid on, as its porousness is essential to the convenience of fresco-painting. In like manner the last finer coats should be lightly floated on to ensure their power of absorption. The following is his method of preparing the ground:—

"The plaster for painting on is composed of lime, not in too caustic a state, and pure quartz sand. With regard to the lime, it should be well and uniformly manipulated, and should be entirely free from any small hard lumps. The sand should be very carefully washed, to cleanse it from clayey or saline particles, and should be afterwards dried in the open air. Sand that is coarse, or unequal in grain, should be sifted; thus the plaster will be uniform in its texture. The proportion of sand to the lime is best learned from experience, and must depend on the nature of the lime. If the plaster contains too much lime, it becomes encrusted too soon, is too smooth in surface, and easily cracks; if it contains too little, it is not easily floated, the successive patches (as the fresco proceeds) are not to be spread conveniently in difficult situations, and the plaster is not so lasting.

"Before laying on the plaster, the dry rough coat is wetted with a large brush again and again till it will absorb no more. Particular circumstances, such as spongy bricks in the wall, humid or very dry weather, &c., dictate the modes in which this operation is to be regulated. The plaster should be laid on lightly and freely with a wooden hand-float: in connecting the successive patches, some portions require, however, to be finished with an iron trowel: in this case care must be taken not to press too strongly, otherwise rust spots might appear in the lime, and even cause portions of the superadded painting to become detached. (A glass float seems to be preferable when a wooden instrument is unfit.) The plaster should be about a quarter of an inch in thickness. The surface of the last coat is then slightly roughened to render it fitter for painting on. The wall thus prepared is to be left a quarter or half an hour before beginning to paint."

The brushes to be employed may be of the common description, only a little longer in the hair than those used in oil-painting. The palette must be formed of zinc or tin, with a rim, to prevent the colours, which are thinned with water, from running over. Beside hogs'-hair tools, small otter-hair pencils are required. Distilled or boiled rain-water, passed through an iron tube, should be used.

The Cartoon can be prepared in the following manner:—Stretch a strong cloth on a frame, and glue over it a paper covering. When this is dry, cover it again in the same manner, taking care to do it evenly. The surface may now be prepared with size and alum. The drawing is to be made with charcoal; and fixed, when completed, by damping the back with cold water, and then steaming in front. When the drawing is thus made, an outline tracing is taken on oiled paper, then nail as much of this outline-drawing as can be finished at one painting to the wet wall, and again trace it with a point, so as to form an indented outline on the lime surface.

We extract the following directions on painting in fresco from the valuable compilation of Messrs. Winsor and Newton:—

"A convenient portion of the outline is to be traced with a sharp point on the plaster; and the painter begins to work, after having assured himself of the fit state of the plaster, which should be of such a consistency as just to receive the impression of the finger, and not be liable to be disturbed by the action of the brush, as the contrary state, besides other inconveniences, would clog the brush with sand. Should the rough coat have been previously well wetted, the plaster will not dry too rapidly; but if, during the course of a dry summer's day, the surface should become too hard, and no longer takes the colour well, the painter, from time to time, takes a mouthful of water and sprinkles it over the surface, in the same way as sculptors sometimes wet their clay models. Much evidently depends on the thorough wetting of the dry mortar before the last preparatory coats are applied.

"After having completed the portion allotted to the day, any plaster which extends beyond the finished part is to be removed, and, in cutting it away, care must be taken never to make a division in the middle of a mass of flesh, or of an unbroken light, but always where drapery, or some object or its outline, forms a boundary; for if this be not attended to, it will be almost impossible, in continuing the work the next day, to match the tints, so that the junction shall be imperceptible; but by making these junctions correspond with the outlines of the composition, the patchwork, which is unavoidable, is successfully concealed.

"In the next day's operation, the surface of the old mortar is to be wetted, as before, and care must be taken to delicately wet the angles round the edge of the portion previously painted.

"To prevent the drying of the work, a board should be padded on one side, the cushion being covered with waxed cloth; a piece of fine linen is then spread over the fresh plaster and painting, and pressed to the surface of the wall by the cushioned side of the board, while the other side is buttressed firmly by a pole from the ground.

"The Germans carefully teach the propriety of making all cuttings and joinings in the plaster at outlines, where it is possible to do so.

"In the finished fresco, the depth of shadows is often increased; parts are rounded, subdued, and softened, by hatching in lines of the colour required, with a brush not too wet: the medium then used being vinegar and white of egg. Shade is more easily added in this way than light, but painters use crayons, made of pounded egg-shells, to heighten the lights. It is to be observed that such re-touchings are useless in frescoes painted in the open air, because the rain washes them away, whilst it does not affect those finished without re-touching.

"According to Professor Hess:—After the painter has laid in his general colour, he should wait half an hour, or an hour, accordingly as the colour sets, before

...l.
...chal.

10. Raguly.
11. St. George.
12. Fleury.

...able
...ents

13. Pierced.
14. Fusils in cross..
15. Cross voided.

(*To be continued.*)

...cut shows the instru-
...d by which the prima

he proceeds to more delicate modelling. In these first operations he should avoid warm or powerful tints, as these can be added with better effect as the work advances. After the second painting, and another shorter pause, the work is finished with thin glazings and washings. In this mode the requisite degree of completion can be attained, provided the daylight and the absorbent power of the plaster last; but if the touches of the pencil remain wet on the surface, and are no longer sucked in instantaneously, the painter must cease to work, for henceforth the colour no longer unites with the plaster, but, when dry, will exhibit chalky spots. As this moment of time approaches, the absorbing power increases, the wet brush is sucked dry by mere contact with the wall, and the operation of painting becomes more difficult. It is, therefore, advisable to cease as soon as these indications appear.

"If the wall begins to shew these symptoms too soon, for example, in the second painting, some time may be gained by moistening the surface with a large brush, and trying to remove the crust or setting that has already begun to take place; but this remedy affords but a short respite. In the additions to the painting on successive days, it is desirable to add the new plaster to that part of the work which is not quite dry, for if added to dry portions, the edges sometimes exhibit spots. Various other effects sometimes take place from causes that cannot be foreseen, and the remedies must be provided by the ingenuity of the artist, as the case may require."

(*To be continued.*)

On the Method of Painting practised in the Ancient Venetian School.

By T. SHELDRAKE.

(*Continued from page* 53.)

It is a singular fact, which I have not skill in physics to be able to account for, though by numerous experiments I have ascertained beyond contradiction, that if upon any degree of brown, between the deepest and the lightest brown yellow, we paint pure white, in gradations, from the solid body to the lightest tint that can be laid on, all the tints between the solid white and the ground will appear to be grey, intense in proportion to the depth of the ground, and the thinness of the white laid upon it. But in every case all the tints laid upon one ground will harmonise with each other, and form one connected chain (if I may use the expression), which will perfectly unite the highest light with the darkest shade.

If, then, we examine the component substances of a Venetian picture, we shall find the lighter parts consist only of white, to represent the light; and of the local colours of the objects it represents, the demi-tints are imitated by an appearance almost as deceptive as the similar appearances in nature: but in every other method of painting, these demi-tints are produced by mixing some dusky colour with the local colours and the light. The comparison of these methods will afford a demonstrative reason why the Venetian must be brighter than any other mode of painting.

Having shewn, as near to a demonstration as the nature of the subject will perhaps admit, why those parts of a Venetian picture that are connected with light and colours are brighter than the corresponding parts of any other pictures, it remains to explain the cause of similar superiority in the darker parts of the same pictures.

It has been said, with much confidence, that as white represents light, so black is the representative of darkness. But this may be true in physics, it certainly is not so in painting; for the painter's art is to represent objects as they appear, in point of colour, to be, not as they really are. Thus, if I know an object is perfectly black, and am to represent it as it appears to be at the distance of fifty feet, black from the palette will not produce a good imitation of it, because the interposition of fifty feet of the atmosphere will cause it to appear of a colour different from what it really is; and *vice versâ*, if we go into a cavern, a cellar, or a room, so darkened that the colour of no object can be distinctly seen, and if we there hold any solid black substance near to the eye, the difference will be visible at once; the black object will be immediately distinguished, by its solidity and colour, from the surrounding space, and such remote objects as may be obscurely visible through it. These objects actually possess their individual colours, and only appear indistinctly from the absence of light. The black object may appear solid, and of that colour, from its proximity to the eye; but the circumjacent ones will appear of a colour perfectly distinct from it, more or less transparent, in proportion to their distance from the eye, and shewing a portion of their individual colours, according to the quantity of ill-defined light that may be admitted. Thus we see (if I may venture to mention so notorious a truism), that shadows are nothing real; they only seem to exist in the absence of light, and give to objects an ill-defined appearance, distinct from, though in some instances mixed with, light and colours in different degrees; but as the painter must represent this appearance by something real, he chooses the colours most analogous, viz., browns, and the most transparent of their class, to represent this transparent, but imperfectly defined appearance in nature.

It has been supposed that the Venetian painters had some peculiarly rich and transparent brown colour, which is seen to pervade all the works of that school; the effect of which no modern artist has been able to imitate, and which therefore is supposed to have been lost. It is not very probable that a colour so common as to pervade the works of the worst as well as of the best artists of that school, could be so unaccountably lost; and, as the effect attributed to it may be easily produced by the mode of painting I have described, it is not unreasonable to conclude that this much-lamented colour has never existed.

It is well known that chalk, and other earths of the same kind, lose, when wetter, much of their whiteness, and become semi-transparent: it is equally certain, that if umber or other earths are mixed with chalk, and saturated with varnish after they are laid in the cloth, they in like manner become diaphanous, and are infinitely more brilliant than the same colours can be when mixed with white lead and oil. This seems, on good grounds, to have been the basis of the Venetian method of painting, and all its peculiar effects: at least if I may draw any conclusion from the numerous experiments I have made. But if artists, whose talents will enable them to repeat those experiments to the best advantage, should be induced to do so, the fact will be determined in the most satisfactory manner.

I may now be permitted to say, it is difficult, if not impossible, to conceive a theory more simple, more

beautiful, or more true, than that of Sir Joshua Reynolds. It is certainly impossible to form a practice more simple, or more conformable to that theory, than the one I have described, as will be evident on recapitulating the particulars.

The artist, having determined what hue (tone ?) should pervade his picture, formed his ground with that colour prepared in distemper; upon this the subject was drawn, and the darker shades painted in with transparent colours, which sank into the ground; with pure white he then painted in all the lights and demi-tints, and lastly, glazed in the colours, each in its place. Upon applying the varnish, the darker shades were as to body, incorporated with the ground; and though different in colour, appeared thinner and more transparent than any colours could be when laid upon any ground; the full effect of every colour was brought out, and the picture was complete.

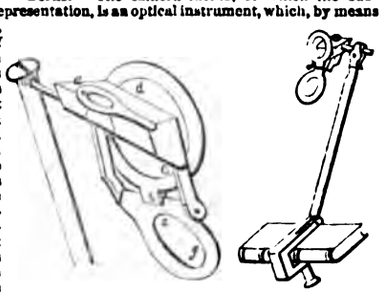
Whoever has been accustomed to paint, or to mark the progress of painting in the common way, and will reflect on the practice of the method I have described, by artists who had been brought up to it, must see that such artists would paint with a degree of facility, expedition, and certainty, as to effect, that could never be equalled in the ordinary way of painting in oil; besides, it will be evident that an artist would not only paint a picture himself with more facility, but, if he had occasion, could employ a number of subordinate artists upon large works, and put those works out of hand with more uniformity, as to merit and effect, than if he were to employ such assistants in similar works if they were to be painted in the common way.

(To be continued.)

ANTIQUITY OF EGYPTIAN ART.

An instrument designed to measure the depth of the Nile sediment (for chronological purposes), has turned up, near the colossal statue in Memphis, at a depth of 39 feet from the surface, a piece of pottery. Mr. Horner infers from the depth at which it lay buried—and Professor Owen repeated the remark before the British Association—that this is a record of the existence of man 13,371 years before A.D. 1854—"of man, moreover," he adds "in a state of civilisation, so far, at least, as to be able to fashion clay into vessels, and to know how to harden them by the action of a strong heat."

CORRESPONDENCE.—"Berks."—The camera lucida, of which the subjoined cut affords a representation, is an optical instrument, which, by means of lenses, a stile, &c., gives the outline of external objects on the paper or canvas with much clearness and accuracy, so that the artist can sketch the subject without his hand moving in a dark box like the camera obscura. This instrument was the invention of the celebrated Dr. Wollaston. In the first figure *d f* are glasses so disposed as to be turned at pleasure into their proper place at the joint *c*. The second figure shows the instrument on its stand, and clamped to a book. The joint by which the prism is attached to the stand is double.



Heraldic Blazon.

(*Continued from page* 51.)

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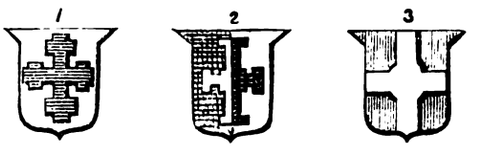
1. Cross crosslet.
2. Potent.
3. Nowy.



4. Pointed.
5. Rayonnant.
6. Hummety.

7. Pale.
8. Engrailed.
9. Patriarchal.

10. Raguly.
11. St. George.
12. Fleury.

13. Pierced.
14. Fusils in cross..
15. Cross voided.

(*To be continued.*)

Technicologia.

145. *Vermilion.*—Vermilion is manufactured in England, Holland, and other parts of Europe, but the finest quality is manufactured in China, which however is often adulterated before it reaches the hands of the painter. Field says of this colour—"It is true that vermilions have obtained the double disrepute of fading in a strong light, and of becoming black or dark by time or impure air; but colours, like characters, suffer contamination and disrepute from bad association; it has happened, accordingly, that vermilion which has been rendered lakey or crimson by mixture with lake or carmine, has faded in the light, and that when it has been toned to the scarlet hue by red or orange lead, it has afterwards become blackened in impure air, &c. Hence the ill-fame of vermilion both with authors and artists."—Real Chinese vermilion is a permanent and a beautiful colour—it is an impalpable powder, possessing great density and opacity when mixed as a paint, but from the ease with which it is adulterated, and the consequent difficulty of obtaining it pure in this country, it is requisite to commission it direct from China in order to ensure its being genuine; it costs in China about 4s. 10d. per lb. Its price in this country varies from 3s. to 6s. per lb.

146. *To Stain Musical Instruments formed of Wood.*—1. *A fine crimson stain:* Take 1lb. of ground Brazil wood and boil in three quarts of water for one hour; strain, and add ½oz. of cochineal, boil it again gently for half an hour and it will be fit for use. [Should more of the scarlet tint be required, boil ½oz. of saffron in one quart of water, and brush it over the work previously to applying the red stain. Observe, the work must be very clean, and of air-wood or good sycamore without blemish. When varnished, it will bear a very rich appearance.]—2. *A purple stain:* Take 1lb. of chip logwood, soak in three quarts of water, boil well for an hour, and then add 4ozs. of pearlash and 2ozs. of indigo powdered.—3. *A fine black:* In general, when black is required for musical instruments, it is produced by japanning—the work being well prepared by size and lampblack; take some black japan and lay on two coats, after which varnish and polish.—4. *A fine blue:* Take 1lb. of oil of vitriol in a clean glass bottle, into which put 4ozs. of indigo, and proceed as directed for No. 3.—5. *A fine green:* Take 3 pints of the strongest vinegar, to which put 4ozs. of the best verdigris powdered, ½oz. of sap-green, and ½oz. of indigo.—6. *A bright yellow:* There is no occasion whatever to stain the wood, as a very small bit of aloes put into the varnish will make it of a good colour, and produce the desired effect.

147. *Mode of Transferring a Print to Glass.*—When a lithographic or other print is required to appear on glass, the glass is first coated with dilute copal varnish, and the paper containing the print is dipped in warm water; and while the varnish remains adhesive, the paper is placed on the varnish, with the print side down, and then gently pressed till all the parts adhere; or several folds of soft paper may be placed on the print, and a piece of plank or other weight placed thereon to keep the print and varnish in contact till both are dry. Then the print being again moistened with water, may be peeled or rubbed off, leaving the ink of the print adhering to the glass. The several parts of the print may then be painted with appropriate colours on the glass, and finished with a ground coat over all.

PAPER-STAINING.

The present method of machine or cylinder printing arose out of a combination of workmen against the introduction of a machine which then existed, and by means of which three blocks were printed at one operation. Three boys were required to attend to the sieves and one man to the blocks; the only machine allowed by them at that time was a pin-roller, it being impossible to lay an even ground or pattern by means of pin-blocks. The cotton printers of Manchester having successfully applied machinery to the printing of their goods, attention being turned to the application of similar machinery to paper-staining, and with considerable success; but as the paper-stainers were unaccustomed to the use of body colours, and as they found it impossible to use size with them, a comparatively low class of article only was produced. The chief objection, however, to the machined papers is, that paste is substituted for size in working the colours, which, when exposed to the action of a moist atmosphere, smear and rub off. Nothwithstanding this objection, the rapidity with which papers were produced, and the price at which they were sold, created a large demand for them; added to which, the importation of paper-hangings from France of a superior quality and lower price than that at which they could be produced in England, caused a corresponding diminution in the demand for hand labour in this country. This combination of circumstances drove the block-printers of England to consider how they could create for themselves work, which they can execute at a price and in such a manner as would again drive from the field their hitherto successful rivals. The first improvement introduced was the process of patching the sieve, or covering it in parts with various colours instead of one colour only, as was the case under the old process. Thus two or more colours are worked by one block, and as the ordinary size colours are used, the advantages of the single block-printing are preserved. The second improvement consists in increasing the size of the block, and so arranging the designs upon it, that five or more colours may be printed at one operation, by working the block in half-lengths, the colours being so arranged that while one-half of the block is laying in what may be termed the first tint, the other half follows with a second colour. By this latter process papers in twenty or thirty colours are printed from four blocks, one man and a boy being all that are required to work them; and the principle is capable of extension to an almost unlimited extent. The papers produced are equal to the single block papers, while the cost of production, as compared with the machined papers, is nearly the same, owing to the great outlay necessary in order to prepare a pattern for the machine, while in the other case it is only necessary to have the blocks cut at the usual cost.

HERALDRY OF THE ANCIENTS.

The necessity of a distinguishing mark or badge in the time of war appears to have suggested the employment of certain symbols by the ancients to denote the bravery, policy, or guardian divinity of their respective states. The ancient standard of Persia was, as we learn from Xenophon, an eagle displayed on a shield. This eagle was the royal standard of Persia from the time of Cyrus the Great to that of Artaxerxes; an eagle was also the arms of Rome. Minerva, the tutelary goddess of Athens, was represented by an owl on the banners and coins of that state. Corinth bore a Pegasus; Tyre, a palm-tree; Antioch, a ram and a star; Chios a sphynx.

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RIBAND ALPHABET.

Bookbinding.

THE earliest records of bookbinding prove that the art has been practised for nearly 2,000 years, previous to which time books were written on scrolls of parchment. Some inventive genius, however, to whom the Athenians erected a statue, at length found out a means of binding books with glue. The rolls of vellum, &c., were cut into sheets of two and four leaves, and were then stitched somewhat as at the present day. Then came the necessity for a covering. The first book-covers appear to have been made of wood, probably merely plain oaken boards, which were afterwards succeeded by valuable carved oak bindings; these were followed by boards covered with vellum or leather, and specimens of such of great antiquity still exist. The Romans carried the art of bookbinding to a considerable perfection, and some of their public officers had books called diptycs, in which their acts were written. An old writer says, that about the Christian æra the books of the Romans were covered with red, yellow, green, and purple leather, and decorated with silver and gold. In the thirteenth century some of the gospels, missals, and other service books for the use of the Greek and Roman churches were covered in gold and silver; some were also enamelled and enriched with precious stones and pearls of great value. In the fifteenth century, when art was universal, such men as Albert Durer, Raffaële, and Giulio Romano decorated books. The use of calf and morocco binding seems to have followed the introduction of printing, and there are many printed books bound in calf with oaken boards, of about the fifteenth and beginning of the sixteenth centuries; these are mostly stamped with gold and blind tools. The earliest of these tools generally represent figures, such as Christ, St. Paul, coat of arms, &c., according to the contents of the book.

In the reign of Henry the Eighth, about 1538, Grafton the printer undertook to print the great Bible, for which purpose he went to Paris, there not being sufficient men or types in England; he had not, however, proceeded far before he was stopped in the progress of this book, when he returned to England, bringing with him presses, type, printers, and bookbinders, and finished the work in 1539. Henry the Eighth had many books bound in velvet, with gold bosses and ornaments, and in his reign the stamping of tools in gold appears to have been introduced. In the reign of Queen Elizabeth some exquisite bindings were done by embroidery; the queen herself used to work the covers with gold and silver thread, spangles, &c. Count Grolier seems to have been a great patron of the art on the Continent, and all his books were bound in smooth morocco or calf, ornamented with gold. The style of the books of Maioli was very similar to that of Grolier or those of Diana of Poictiers, the specimens done for her being among the finest ever produced, and were no doubt designed by Petit Bernard. Roger Paine was the first Englishman who produced a really good binding, and some of his best works, such as French romances, were powdered with the fleur-de-lis. His books on chivalry had suitable ornaments: on poetical works he used a simple lyre, and carried the emblematical style of binding as far as emblems ought to be used. The following bill of his for binding a work is a curiosity, and shews how moderately he charged :—

Vanerii prodium Rusticum Parisiis, MDCCLXXIV.

Bound in the very best manner, in the finest green morocco, the back lined with red morocco; fine drawing-paper, and very neat morocco joints inside; there was a few leaves stained at the foredge, which is washed and cleaned	0	0	6
The subject of the book being Rusticum, I have ventured to putt the Vine Wreath on it. I hope I have not bound it in too rich a manner for the Book: it takes up a great deal of time to do these vine wreaths. I guess within time I am certain of measuring and working the different and various small tools required to fill up the vine wreath, that it takes very near three days' work in finishing the two sides only of the book; but I wished to do my best for the work, and at the same time I cannot expect to charge a full and proper price for the work, and hope that the price will not only be found reasonable but cheap	0	18	6

Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

By FRANCIS BENJAMIN THOMPSON.

CHAPTER V. (*continued*). — INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Sulphur (continued).—Dr. Mallet, of Alabama, mentions the following curious circumstance which fell under his observation :—

Some clean roll-sulphur was melted in a glass evaporating dish, for the purpose of exhibiting to students the production of the plastic modification on pouring it while thick and viscid into cold water. A portion was so poured into water, and the remainder was heated up to a higher temperature, so as to shew the renewed fluidity of the melted mass. Being forgotten for a few minutes over the lamp, the temperature of the sulphur rose so high that it took fire, and the lamp was then removed, and the flame extinguished by throwing a cloth over the dish.

On examining the sulphur an hour or two after, it was found solidified in a cake of distinctly prismatic crystalline structure, and of a brownish-red colour. It was broken up into pieces of a size to go into a bottle, and in the interior were observed some little cavities lined with stout prismatic crystals.

This sulphur, having been set aside for several months, presents just the same appearance now as when first prepared. Its colour is nearly chocolate-brown, verging on red, and its hardness is greater than that of common roll-sulphur. Re-fused at a gentle heat it forms a thin, very dark brown liquid, appearing almost black by reflected light. If left to cool slowly in the air this solidifies again to a crystalline mass, like the original cake, but a little darker in colour. If a portion be poured while melted into cold water it forms drops of a deep red colour (like Pyrope) by transmitted light, and almost black by reflected light. These drops do not solidify at once but remain soft, so that on touching them

with a wire under water they may be drawn out into threads. When perfectly solidified they have a vitreous lustre and the same very dark red colour as in the plastic state, resembling somewhat "glass of antimony." They gradually, in the course of two or three days, become in part opaque and of a light red-brown colour, this change being confined for the most part to the surface of the drops, of which the interior remains glassy as before, but in some cases extending in veins and striæ through the interior of a drop. The change from the glassy to the opaque state begins usually at distinct points, and spreads gradually over the surface.

Sulphuric acid (symbol SO^3, equivalent 40, sp. gr. [anhydrous] 1·97 at 65° F.) is obtained either by simple distillation from copperas (which was the original method), or by the combustion of sulphur, in large leaden chambers, in combination with substances yielding a large supply of oxygen, which is the method generally practised at the present day. The latter process is conducted in various ways; the most usual method in this country is the following. Common brimstone, coarsely ground, is mixed with saltpetre, in the proportion of 8 lbs. of the former to 1 lb. of the latter; the mixture is spread upon iron plates set upon stands of lead, in a large chamber lined with lead, and covered at the bottom with a thin sheet of water. The materials are ignited by means of a hot iron, and the door is closed. The sulphur in vapour then combining with the oxygen of the nitre, forms sulphuric acid, and condenses in the water, which is afterwards drawn off and concentrated, first in leaden vessels, and then in glass retorts (which are sometimes lined internally with platinum); but some manufacturers dispense with the leaden boilers altogether. To test the freedom of sulphuric acid from nitric and hyponitric acids, the following method is given by M. Vincent.* Some iron filings are thrown into a few grammes of the sulphuric acid to be tested. If nitric or hyponitric acid be present, the colour produced is rose red, bluish red, or violet-blue, according to the degree of purity.

(To be continued.)

PHANTASMAGORA SLIDERS.

There are two methods by which the phantasmagora sliders now employed are produced. In one of these the outline and detail are entirely the work of the artist's pencil. For pictures representing landscapes, or wherever a spirited painting is required, this is the exclusive method employed. The colours are rendered transparent by being ground in Canada balsam, and mixed with varnish. The other method is a transfer process. The outlines of the subject are engraved on copper plates, and the impression is received from these on thin sheets of gelatine, and is then transferred to a plate of glass, the impression being burned in the same manner as is effected in earthenware. Sliders produced in this way receive the distinctive name of copper-plate sliders. The subject is merely represented in outline, it being left to the artist to fill up with the necessary tints, &c. The advantages of this method for the production of paintings of a limited kind are obvious.—*Dr. Ure.*

CORRESPONDENCE.—*Admission of Students to the Royal Academy.*—"W. R. M."—Probationers are admitted by the first Council in January and July. Specimens of their abilities must be sent in on or before the 28th of June or the 28th of December. On writing to the keeper, enclosing testimonials of respectability, &c., a printed form will be returned, the blanks of which must be filled up by the applicant, and the paper sent in with his specimens.

* "Journal de Chimie Méd.," 1857, p. 522.

Royal Academy.

The first idea of a public exhibition of Art was suggested by the interest shown on the part of the public to see that at the Foundling Hospital, where crowds resorted to behold the pictures given by Hogarth, Highmore, Wills, &c., in aid of Captain Coram's noble institution. An academy for drawing from the life had been formed early in the eighteenth century, but the Duke of Richmond has the credit, later in the century, of establishing the first school for the study of the antique, having fitted up a gallery with a number of casts, busts, and bas-reliefs, moulded from the most select antique and modern figures in Rome and Florence. Cipriani taught in this academy for a few months. Other associations arose from time to time. In 1711, Sir Godfrey Kneller was the director of one in which Vertue the engraver studied. Some time after, Sir James Thornhill founded a school for drawing, in rooms built at the back of his house in St. Martin's Lane, which however, sunk into insignificance, and after his death, Hogarth, who was Thornhill's son-in-law, became possessed of the apparatus; in Hogarth's hands a new society flourished, and was ultimately known as the Society of Incorporated Artists, from which the Royal Academy has arisen. The essential portions of a Royal Academy, namely, an exhibition of modern Art and schools for the study of the life and the antique, were then in existence, although separate from each other. The idea of an annual exhibition of the collected works of English artists naturally suggested itself, and by a favourable coincidence, the Society of Arts having been then a few years established, lent their great room for the purpose of a *free and public exhibition of modern Art*, April 21, 1760. The admission was *free*, the price of the catalogue sixpence. Such success attended this first exhibition, that for the next year the great room of Spring Gardens was obtained; the price of the catalogue was raised to one shilling, and no individual or a party was admissible without purchasing one. On the third exhibition, Dr. Johnson was engaged as an apologist, the sum of one shilling being charged for admittance. Johnson's advertisement ran thus:—

"The purpose of this exhibition is not to enrich the artist, but to advance the art; the *eminent are not flattered with preference*, nor the *obscure* insulted *with contempt*; whoever hopes to deserve public favour is here *invited to display his merit*."

On this exhibition proving successful, a shilling became the accustomed charge, and has remained so, even to the present time. In 1765, the charter of incorporation was obtained, and the association began to grow rich and influential. The possession of money, and the mixture of different degrees of talent, bred dissension. Out of the members, amounting to 149, many were hardly deserving the name of artists, and the preponderance of bad and indifferent artists gave an objectional tone to the society, which caused the secession of Reynolds and West.

The Royal Academy was planned in 1768 by Chambers, West, Cotes, and Moser. Reynolds declining to take any active part, a list of thirty members was made out, and West undertook to persuade Reynolds to join their party; he accordingly called upon him, and after a conference of two hours, Reynolds ordered his carriage, and, accompanied by West, drove to the place of meeting; on Reynolds entering the room, the whole company rose and saluted him as "president." He felt the

honour that had been done to him; but declined accepting the office until he had consulted his friends Burke and Johnson. The result is well known. The new society sought to improve upon the Incorporated Society, by supporting a school out of the profits of the annual exhibition, and distributing any surplus which might arise, in useful charities. After some hesitation on the part of George III., the royal consent was given, and on the 10th of December, 1768, the king signed the constitution, and founded the "Royal Academy for the purpose of cultivating and improving the Arts of Painting, Sculpture, and Architecture."

The king now voluntarily offering to supply all annual deficiencies out of his private purse, enabled the new academy to propose rewards for the encouragement of rising genius, and to bestow annuities upon talented students, to defray their expenses during a limited residence at Rome.

Dr. Johnson was appointed Professor of Ancient Literature, and Dr. Goldsmith, Professor of Ancient History. To give dignity to the Royal Academy of Great Britain, the king bestowed knighthood on the president, to the great delight of Johnson, who, though he had abstained from wine for some years, drank it, on the celebration of that occasion. The king, at first, declared that his patronage should be equally divided between the Royal Academy and the old Incorporated Society; but in a very few years the old society was broken up, and the academy enjoyed that exclusive patronage of royalty which it still retains.

On the question of the influence of academies upon Art especially, Voltaire asserted, that the French school became mannerists and mere imitators, after the establishment of the French academy; and Hogarth energetically opposed the proposition to establish one in this country. He declared that the institution would serve to "raise and pension a few bustling and busy men, whose whole employment will be to tell a few simple students when a leg is too long, or an arm too short. More will flock to the study of Art than what genius sends; the hope of profit, or the thirst of distinction, will induce parents to push their offspring into the lecture room, and many will appear, and but few will be worthy. Paintings are plentiful enough in England to keep us from the study of nature; but students who confine their studies to the works of the dead need never hope to live themselves, they will learn little more than the names of painters: true painting can only be learnt in *one school*, and *that is kept by Nature*."

PAINTED GLASS.

So far as internal architecture is concerned, the invention of painted glass was, perhaps, the most beautiful ever made. The painted slabs of the Assyrian palaces are comparatively poor attempts at the same effect. The hieroglyphics of the Egyptians were far less splendid and complete, nor can the painted temples of the Greeks, nor the mosaics and frescoes of the Italian churches be compared with the brilliant effects and parti-coloured glories of the windows of a perfect Gothic cathedral, where the whole history of the Bible is written in the hues of the rainbow by the earnest hand of faith. Unfortunately, no cathedral retains its painted glass in anything like such completeness; and so little is the original intention of the architects understood, that we are content to admire the plain surface of white glass, and to consider this as the appropriate filling of traceried windows, just as our fathers thought that whitewash was not only the purest but the best mode of decorating a Gothic interior.—*Fergusson.*

Technicologia.

148. *Abate's Method of Representing Objects by Printing Directly from them.*—Suppose a sheet of veneering-wood be the object from which impressions are to be taken; I expose the wood for a few minutes to the cold evaporation of hydrochloric or sulphuric acid,* or I slightly wet it with either of these acids diluted, and then wipe the acid off from the surface. Afterwards it is laid upon a piece of calico or paper, or common wood, and by a stroke of the press an impression is taken, which is, of course, quite invisible; but by exposing this impression, immediately after, to the action of a strong heat, a most perfect and beautiful representation of the printing wood instantaneously appears. In the same way, with the same plate of wood, without any other acid preparation, a number of impressions, about twenty or more, are taken; then, as the acid begins to be exhausted and the impressions faint, the acidification of the plate must be repeated as above, and so on progressively, as the wood is not in the least injured by the working of the process for any number of impressions. All these impressions shew a general wood-like tint, most natural for the light-coloured woods, such as oak, walnut, maple, &c.; but for other woods that have a peculiar colour, such as mahogany, rosewood, &c., the impression must be taken, if a true imitation be required, on a stuff dyed of the light colour of the wood. It must be here remarked, that the impressions, as above made, shew an inversion of tints in reference to the original wood, so that the lights are dark, and *vice versâ*, which, however, does not interfere with the effect. The reason of it is, that all the varieties of tints which appear in the same wood are the effect of the varying closeness of its fibres in its different parts, so that where the fibres are close, the colour is dark, and light where they are loose; but in the above process, as the absorption of the acid is greater in proportion to the looseness of its fibres, the effect must necessarily be the reverse of the above. However, when I wish to produce the true effect of the printing wood, I alter the process as follows:—I wet the surface upon which the impression is to be taken with dilute acid, and then I print with the veneering-wood previously wetted with diluted liquid ammonia; it is evident that in this case the alkali neutralising the acid, the effect resulting from the subsequent action of heat will be a true representation of the printing surface. Such is thermography, or the art of printing by means of heat. Now, it is nothing but natural to anticipate, in regard to this art of printing directly from objects, that it will afford most important services to the natural, botanical, mineralogical, and anatomical sciences; as it is by its means that the internal structure of bodies is unveiled to the eyes of the philosopher, and the wonders of nature in its inexhaustible varieties are indefinitely multiplied, to be subjected to the investigation and to serve the gratification of mankind. But the new art will prove not less useful to the decorative arts, particularly in its application to produce imitations of rare and costly woods as well as of works of art, mosaic and inlaid work applicable for paper-hangings, or for furniture in the place of veneering, these imitations being produced at an exceedingly low cost, while they rival in perfection the original objects, enabling those whose means are limited to obtain decoration at once cheap and in good taste.

* We have used the other acids with success.—Ed.

Gothic Arches and Vaults.

The appellation of Gothic is here restricted to that kind of building, in which the covering of a void space is composed of two similar curves meeting together, and forming an angle at the top, usually termed a pointed arch.

The tops of apertures formed by inclined stones, instances of which occur over the entrance into the great pyramid, and in other very ancient works, if they bear some resemblance to the object before us, are yet, in their structure, quite dissimilar; and though in old times convenience or accident occasioned the appearance of an arch worked to a point, we must still look for some strongly operating cause for its establishment on a regular system, during the period in which Gothic architecture flourished.

The Saxons and the early Normans, imitating the Romans, introduced the circular arch into their vaulting; and in their cross-vaulting the intersections on the diagonal lines produced angles or groins, as they are technically termed: but the groined arches of those times were small; and the vaulting or shell, being constructed of rubble-work, was too feeble to be executed on a large scale. When, therefore, vaults of larger dimensions than those which are found in crypts were employed for the covering of our churches, some expedients became necessary for fortifying the weak parts. For this purpose, to the arched ribs in the transverse direction of the vaulting, the architect added diagonal ribs under the intersections of the cross-vaulting; which, while they afforded strength to the superincumbent shell, became a matter of ornament; being wrought in stone formed into mouldings, and sometimes enriched with carving. Thus groined arches of the second class were formed; and, says Mr. Saunders:—*

"The means pursued in the construction of vaulting at this period are particularly interesting, as they conducted to that change which has been the object of so much inquiry. The builders do not seem to have been aware that, in the projection of the curves, if the diagonal ribs were circular, those at the sides should be elliptical, to coincide with each other; and, on the contrary, that if the side ribs were circular, the diagonal ribs should be elliptical.

"We meet with the second class of vaulting mostly in the aisles of cathedrals and large churches, built, or altered, during great part of the twelfth century. The bays† of vaulting were generally longest on that side which was in the direction of the aisles; the long side having at first an arch which was a semicircle; and the shorter side, which crossed the aisle, being in like manner terminated at the top, but having the horns of the semicircle continued downwards in perpendicular lines to the same level base with the others. It was probably soon observed, that when the sides of a bay were nearly of equal length, the arch of the diagonal rib obtained but a small height in proportion to its subtense, and was consequently weak where strength was chiefly wanted. More elevation was procured by raising all the side arches; and sometimes, instead of continuing the horns of the transverse arches downwards in perpendicular lines, the curve exceeded the half of a circle, forming what is called the horse-shoe arch. With all these expedients they could not, however, make the several parts to conform to each other; and the sofit of the vaulting is seen to be connected to the ribs in many distorted shapes. Almost every specimen in this stage of their works evinces a struggle to accomplish the twofold object of applying semicircular diagonal ribs for greater strength; and of combining three arches of equal height but of different subtenses, in one bay of vaulting, in a manner that might produce a regularity in the workmanship. Not being able to effect this with circular topped arches, recourse was had to an expedient, simple in itself, but which led to the production of those extraordinary works, which are not less the admiration than the astonishment of the present age."

(*To be continued.*)

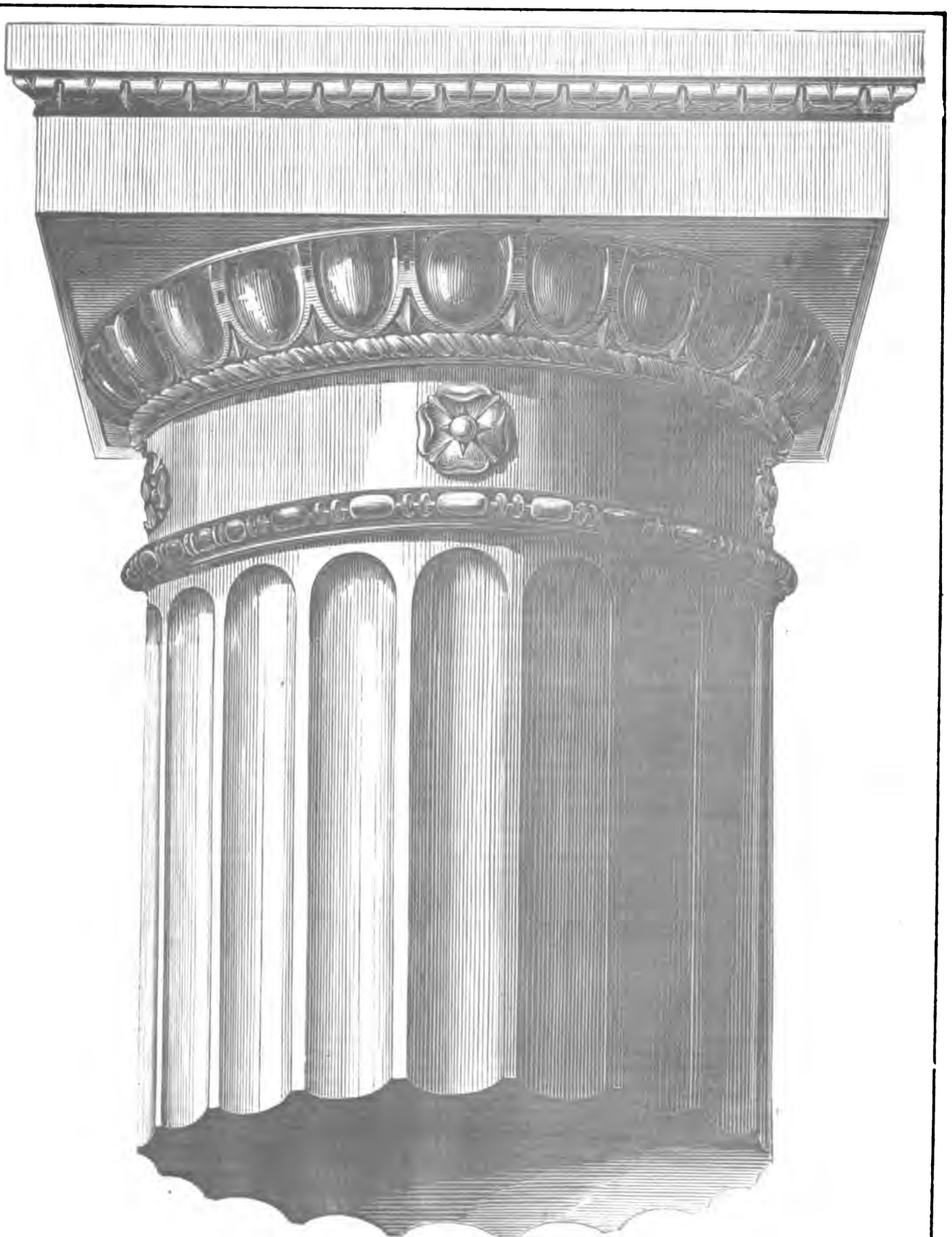
* "Archæologia," vol. xvii.

† "A bay is the quadrangular space over which a pair of diagonal ribs extend, that rest on the four angles. The same term is also used for the horizontal space comprised between two principal beams."

TESSELLATED PAVEMENT.

The following description is given by a correspondent of the *Athenæum* of a Roman tessellated pavement recently discovered within Dorchester Jail (Dorset):—"The mosaic itself must have been originally a square flooring of a public apartment extending at least twenty feet each way—perhaps more. The intricacies of the pattern are however central; and the outer stripes of greater breath, the outer borderings of larger proportions, as they extend. In the very centre there is a lozenge of black inclosed in red or orange; and winged or flanked by two heart-shaped figures of successive black, white, blue or gray and red or orange outlines and bodies. These figures are inclosed in a black circle, and the inner interstices half filled in with white, half with gray,—the outer rim of the circle being boldly rayed in gray, forming thus a brilliant star. The rays repose on bright red bordered by another black circle, exteriorly to which runs an octagon of bold black lines, the interspace being occupied with the blue or gray colour. Broad octagonal stripes successively appear of red, gray, and white; and here two great black squares are laid transversely over one another, so as to include the last (white) octagon, and to project their own eight angles in stellar form,—as if to give the mathematics of the whole design. As a tangent to the angular points of the superimposed square a greater square of black is drawn, leaving numerous interspaces and angularities, lozenge shaped, triangular, &c. (from black bars drawn across as tangents to the angular points of the other inner square), and all these are laid so as to balance one another in the prevailing colours, red, white, and gray. Outside the greater square succeeds a broad and beautiful border of chequers of a quadripartite series, red, white, gray, and black,—so beautifully balanced as to indicate to the eye the happiest possible decision and symmetry. These chequers are environed not by the usual twisted cable pattern, as at Burton-upon-Trent, but by what I would take the liberty of calling a flattened chainwork—the links composed of double sets of all the four colours. A plain border of broad red, gray, and white stripes comes next. It is succeeded by another of the red, rayed outwards, met by, or locked into, one of gray, rayed inwards. The outer borders, as far as traceable, are red of great breadth, blue or gray of narrower stripe, and white of same breadth as the red,—but beyond even these the red and white commence again; so that I deem it very questionable whether the full extent of this fine pavement has been reached in the exhumations, although means were taken on discovering any one point to measure off and dig for the corresponding point, and thus to present as many chances as possible of realising what it had been."

WINDOW IN STAINED GLASS.



ROMAN DORIC.

Humboldt on Landscape Painting.

AS fresh and vivid descriptions of natural scenes and objects are suited to enhance a love for the study of nature, so, also, is landscape painting. Both shew to us the external world in all its rich variety of forms, and both are capable, in various degrees, according as they are more or less happily conceived, of linking together the outward and the inward world. It is the tendency to form such links which marks the last and highest aim of representative art; but the scientific object to which these pages are devoted, restricts them to a different point of view, and landscape painting can be here considered only as it brings before us the characteristic physiognomy of different portions of the earth's surface, as it increases the longing desire for distant voyages, and as, in a manner equally instructive and agreeable, it incites to fuller intercourse with nature in her freedom.

In classical antiquity, from the peculiar direction of the Greek and Roman mind, landscape painting, like the poetic description of scenery, could scarcely become an independent object of art: both were used only as accessories. Employed in complete subordination to other objects, landscape painting long served merely as a background to historical composition, or as an accidental ornament in the decoration of painted walls. The epic poet, in a similar manner, sometimes marked the locality of particular events by a picturesque description of the landscape, or, as I might again term it, of the background, in front of which the acting personages were moving. The history of Art teaches how the subordinate auxiliary gradually became itself a principal object, until landscape painting, separated from true historical painting, took its place as a distinct form. Whilst this separation was being gradually effected, the human figures were sometimes inserted as merely secondary features in a mountainous or woodland scene, a marine or a garden view. It has been justly remarked, in reference to the ancients, that not only did painting remain subordinate to sculpture, but more especially, that the feeling for picturesque beauty of landscape reproduced by the pencil was not entertained by them at all, but is wholly of modern growth.

Graphical indications of the peculiar features of a district must, however, have existed in the earliest Greek paintings, if (to cite particular instances) Mandrocles of Samos, as Herodotus tells us, had a painting made for the great Persian king of the passage of the army across the Bosphorus; or if Polygnotus painted the destruction of Troy in the Lesche at Delphi. Among the pictures described by the elder Philostratus mention is even made of a landscape, in which smoke was seen to issue from the summit of a volcano, and the stream of lava to pour itself into the sea. In the very complicated composition of a view of seven islands, the most recent commentators think that they recognise the representation of a real district, viz. the small volcanic group of the Æolian or Lipari Islands, north of Sicily.

Perspective scene painting, which was made to contribute to the theatrical representation of the masterworks of Æschylus and Sophocles, gradually extended this department of art, by increasing a demand for the illusive imitation of inanimate objects, such as buildings, trees, and rocks. In consequence of the improvement which followed this extension, landscape painting passed with the Greeks and Romans from the theatre into halls adorned with columns, where long surfaces of wall were covered, at first with more restricted scenes, but afterwards with extensive views of cities, sea-shores, and wide pastures with grazing herds of cattle. These pleasing decorations were not, indeed, invented by the Roman painter, Ludius, in the Augustan age, but were rendered generally popular by him, and enlivened by the introduction of small figures. Almost at the same period, and even half a century earlier, amongst the Indians, in the brilliant epoch of Vikramaditya, we find landscape painting referred to as a much practised art. In the charming drama of "Sacontala," the king, Dushmanta, has the picture of his beloved shewn him; but not satisfied with her portrait only, he desires that "the paintress should draw the places which Sacontala most loved—the Malini river, with a sandbank on which the red flamingoes are standing; a chain of hills which rest against the Himalaya, and gazelles reposing on the hills." These are no small requisitions; they indicate a belief, at least, in the possibility of executing complicated representations.

In Rome, from the time of the Cæsars, landscape painting became a separate branch of Art, but so far as we can judge by what the excavations at Herculaneum, Pompeii, and Stabia, have shewn us, the pictures were often mere bird's-eye views, resembling maps, and aimed rather at the representation of seaport towns, villas, and artificial gardens, than of nature in her freedom. That which the Greeks and the Romans regarded as attractive in a landscape, seems to have been almost exclusively the agreeably habitable, and not what we call the wild and romantic. In their pictures, the imitation might possess as great a degree of exactness as could consist with frequent inaccuracy in regard to perspective, and with a disposition to conventional arrangement; their compositions of the nature of arabesques, to the use of which the severe Vitruvius was averse, contained rhythmically recurring and tastefully arranged forms of plants and animals; but, to avail myself of an expression of Otfried Müller's, "the dreamy twilight of mind which speaks to us in landscape appeared to the ancients according to their mode of feeling, incapable of artistic representation."

The specimens of ancient landscape-painting in the manner of Ludius, which have been brought to light by the excavations at Pompeii (lately so successful), belong most probably to a single and very limited epoch, namely, from Nero to Titus, for the town had been entirely destroyed by earthquake sixteen years before the catastrophe caused by the celebrated eruption of Vesuvius.

SEPIA.

This is a secretion of the cuttlefish, and when fresh is a black glazy liquid of a viscid consistence, a peculiar fishy smell, and very little taste. It is preserved for use by being spread round saucers or gallipots, so as to dry before putrefaction commences. It is much superior in ease of working to Indian ink, which latter dries so quickly that it is difficult to colour a large pale shadow with it, and when once dry, some part always adheres to the paper, and cannot be removed, whereas sepia may be washed almost clear off.

On the Method of Painting practised in the Ancient Venetian School.

By T. SHELDRAKE.

(*Continued and concluded from page* 59.)

I am sensible how little attention will, and perhaps ought to be paid to observations on painting, if made by those who are not professionally artists: for practical men acquire a kind of knowledge that can never be obtained in any other way; but at the same time they contract prejudices that often prevent them from fully investigating any novelty in practice that may be offered to their notice. The speculative man, on the contrary, who investigates the properties of matter, unshackled by practical prejudices, and with ideas purely chymical or philosophical, will be more likely to ascertain all the facts relative to any theory that may become the object of inquiry. In this way I hope I have proceeded in this investigation. I have endeavoured to consider pictures as masses of matter, possessing the properties, but differing from each other in degree of brilliancy, transparency, and duration. I have endeavoured to ascertain the causes of this difference, with what success the society will determine, and with what utility must be hereafter ascertained, by the practice of those for whose use the investigation was intended.

I ought, perhaps, here to take leave of the subject; but as I have been induced to submit to the society's notice an attempt at painting, it may be expected that I should give an account of the manner in which the pictures I have sent were painted.

I have already mentioned that there are some difficulties in the method of painting I have described, as being that of the old artists, and which would form objections of considerable force to the practice of it by artists who are well acquainted with the usual modes of painting: these difficulties are, first, the ground absorbs the oil from the colours so fast, that they are not so manageable as in oil-painting; secondly, the effect of the picture is not seen till the finishing varnish is laid on: and thirdly, as the effect is not seen till the picture is finished, it will sometimes disappoint the artist, and in that case it will be difficult, if at all practicable, to alter it.

I prepared the ground in distemper, and painted the dark parts in the way I have described; I then varnished the ground with the copal oil-varnish, till it was fully saturated, and by this means the full effect of that part of the picture was seen; upon this I painted the lighter parts with white, using much of the vehicle where the colour was thin and little in the solid parts, leaving the white in them dead: by this means I understood the effect of my chiaro-oscuro, as I saw the effect of the demi-tints nearly as well as when the picture was finished.

Upon this I glazed the colours, in the way I have described in the beginning of this paper, and finished the picture. I often found (probably from want of practice) that the effect was different from what I intended, as the effect of the colours, added to that of the chiaro-oscuro, produced an essential alteration in the whole; as I took care in general that the defect did not arise from too much white, I added more where it was deficient, and glazed fresh colours over it, which united perfectly with what had been done before, and did not give the appearance of a mended picture. If the defect was from too much white, I glazed on it a colour similar to that of the ground, painted with fresh white upon that, and glazed the proper colours over it. In this way I found I could alter the picture, but not so well as in the former case.

I found I could, when necessary, increase the effect of the picture, by painting on the principal mass or masses of light with the local colours, only mixed with white, as this practice brought those parts more forward, by making them appear solid, and thus contrasting them with the transparency of the rest of the picture. In this way I found I could use the colours tempered with copal varnish without difficulty; and I believe, that if I had been accustomed to paint large pictures, I could have painted one as large as life as easily as either of those I have submitted to the society's inspection.

Technicologia.

149. *Imitation Morocco Leather for Walls, &c.*, may be produced by laying upon a thickly painted wall a coat of thick tenacious paint, and giving it the peculiar effect of the surface of morocco, by means of a toothed instrument made either of ivory or steel, and finishing it with another coat of paint and of varnish.—*Hay.*

150. *To make Crayons for Drawing on Glass.*—Melt together equal quantities of asphaltum and yellow wax; add lamp-black, and pour the mixture into moulds for crayons. The glass should be well wiped with leather, and in drawing be careful not to soil the glass with the fingers. In trimming these crayons, if the edge be bevelled, like scissors, the point may easily be rendered very fine.

151. *To Frost the Surface of Aluminium.*—At the last meeting of the British Association, Dr. Macadam stated that some aluminium had a short time ago been obtained for the purpose of making medals. When the medals were struck, a peculiar gray appearance was noticed on their surface, which it was supposed arose from the uncleanness of the die. Close examination, however, shewed that this was not the case. Some of these medals were subjected to the action of hydrochloric acid and nitric acid separately, without producing much effect on their surfaces. When some of them were put in a solution of caustic potassa, they were acted on very violently, hydrogen being evolved, and the surface of the metal becoming beautifully frosted. This phenomenon of an alkali comporting itself to a metal as acids do, is a most remarkable exceptional feature. After aluminium has been frosted in this manner it does not become tarnished on exposure to the action of the air.—On the same occasion Mr. F. Crace Calvert said, the greatest objection to the use of aluminium in the arts arose from the fact that it decomposed rapidly in water, at 212°, and, indeed, at all temperatures more or less. A wire of aluminium which he had left closed in a tube of water for twelve months had become converted into gelatinous alumina. He found that aluminium mixed with a small portion of iron was less acted on by water than when pure.

Gothic Arches and Vaults.

(*Continued and concluded from page* 64.)

Perplexed by circular arches of different subtenses, in the same bay, and struck with the unseemly appearance of bringing down the horns of the smaller arches, the artist devised the expedient of dividing the semicircle that extended over the longer side into two portions, one of which was placed over the narrower side, and, being raised to the same height as the arch over the longest, formed the pointed top where they met. This contrivance was eagerly adopted, on its discovery, because it removed many difficulties, and to the shell of vaulting gave regularity in the adjustment of its parts.

After the discovery evinced in this third class of groined arches, the subsequent improvements easily presented themselves. The ribs were now put up before the shell; and, to give strength to the transverse ribs, a stone band was added beneath the ridge, for the purpose of connecting the several ribs together, and facilitating the introduction of intermediate ribs between those in the diagonal and the transverse positions. By this contrivance, that fourth class of groined arches was executed which appeared towards the end of the thirteenth century, and by which the system of vaulting obtained a high degree of perfection. The rib-work of the fourth class of vaulting easily led the way to all the playful variety, seen not only in the tracery of the arched ceilings, but also in every other part that had any relation to it.

In the primary establishment of the pointed arch vaulting in this country, the first essays towards a correspondent window consisted in combining several narrow ones together, which being separately pointed at the top, have obtained the name of lancet windows: the most successful instances are in the combination of three, the middle one being higher than the other two. This manner was not long practised before it was found that a pointed arch passing over the whole, and including along with the combined lancet windows, surmounted circles, variously disposed, and progressively changed to mullions spreading upwards into diversified ramifications, would better accord with the upper lines of the interior of the building: this association of lines being approved, the pointed arch became the established practice for terminating every opening, and constituted the system of what is called Gothic architecture.

If the antiquary will not ascribe the ornaments characteristic of the Gothic architecture of the times of Henry the Third, and succeeding ages, to the vaulting of the naves of the cathedrals, nor the pointed arch to the necessity for its production, but only to fortuitous circumstances, it must be acknowledged, that the contemporaneous production is remarkable, especially as those ornaments and that form are useful only in vaulted buildings.

The second step differed from the first, inasmuch as at the vertex of the vault, a continued key-stone or ridge projects below the surface of the vault, and forms a feature similar to the ribs. But here it was necessary that the ridge should be a stone of great length, or having artificially that property, because its suspension by a thinner vault than itself would be unsafe, unless assisted by the rib arches over the diagonals and side, a distance equal to half the width of the vault. To obviate this objection, other ribs were introduced at intervals, which may be conceived to be groined ribs over various oblongs, one side continually decreasing. This practice had a further advantage, as the panels or vaults between the ribs might become proportionally thinner as the principal supports increased. It is now that the apparent magic hardiness of pointed vaulting and the high embowered roof began to display itself; from slender columns to stretch shades as broad as those of the oak's thick branches, and in the levity of the panel to the rib to imitate that of the leaf to the branch.

On comparing rib-pointed vaulting with Roman vaulting, it will be invariably found that the rib itself is thinner than the uniform thickness of the Roman vault under similar circumstances; and that the panel, which is the principal part of the vault in superficial quantity, sometimes does not exceed one ninth part of the rib in thickness. The Gothic architects, it has been expressively said, have given to stone an apparent flexibility equal to the most ductile metals, and have made it forget its nature, weaning it from its fondness to descend to the centre.

French Polish.

Dissolve one part of gum mastic and one part of gum sandarac in forty parts of spirit of wine, and then add three parts of shell-lac. This process may be performed by putting the ingredients into a loosely corked bottle, and then placing it in a vessel of water heated to a little below 173° F., or the boiling point of spirit of wine, until the solution be effected; the clear solution may then be poured off into another bottle for use.

The mode of application necessary for French polish differs from that of ordinary varnishes, being effected by rubbing it upon the surface of the material requiring polishing with a fine cloth, and using oil and spirit of wine during the process. In applying it to large surfaces, use a rubber formed of a flat coil of thick woollen cloth, such as drugget, &c., which must be torn off the piece in order that the face of the rubber, which is made of the torn edge of the cloth, may be soft and pliant, and not hard and stiff, as would be the case were it to be cut off, and therefore be liable to scratch the soft surface of the varnish. This rubber is to be securely bound with thread, to prevent it from uncoiling when it is used; and it may vary in its size from one to three inches in diameter, and from one to two inches in thickness, according to the extent of the surface to be varnished. The varnish is to be applied to the middle of the flat face of the rubber by shaking up the bottle containing it against the rubber: it will absorb a considerable quantity, and will continue to supply it equally, and in a due proportion to the surface which is undergoing the process of polishing. The face of the rubber must next be covered by a soft linen cloth doubled, the remainder of the cloth being gathered together at the back of the rubber to form a handle to hold it by, and the face of the cloth must be moistened with a little raw linseed oil* applied upon the finger to the middle of it, and the operation be commenced by quickly and lightly rubbing the surface of the article to be polished in a constant succession of small circular strokes; and the operation must be confined to a space of not more than ten or twelve inches square, until such space is finished, when an adjoining one may be commenced and united with the first, and so on until the whole surface is covered. The varnish is enclosed by the double fold of the cloth, which, by absorption, becomes merely moistened with

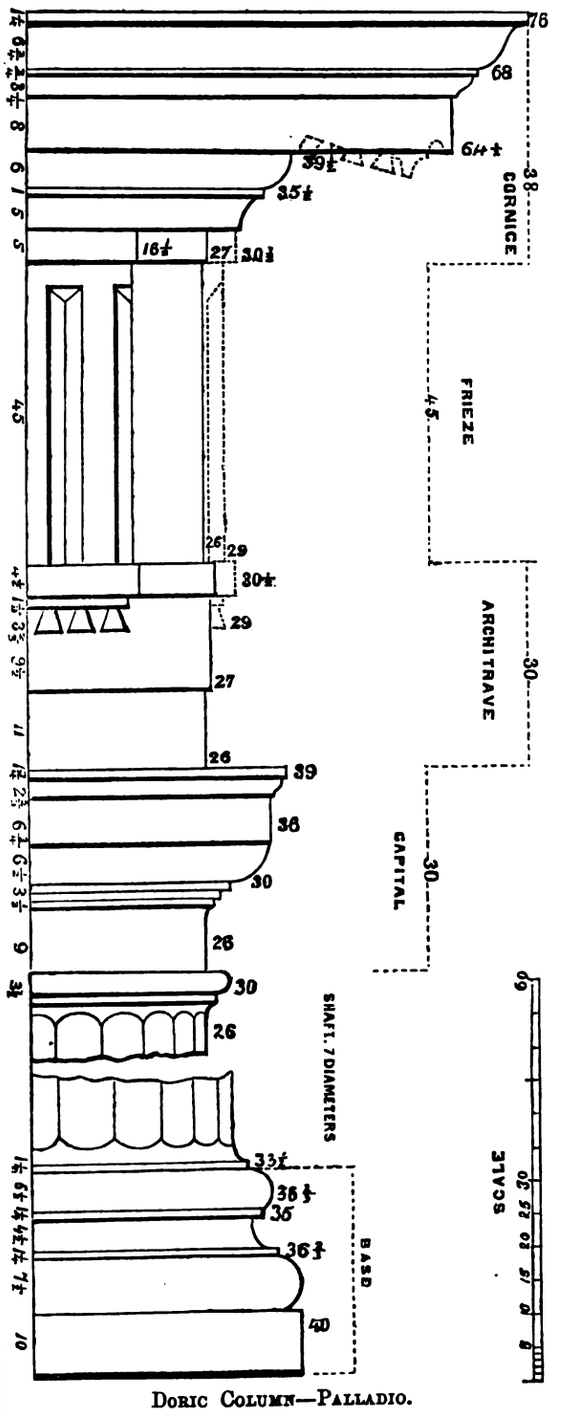
* This may be either coloured with alkanet root or not.

it, and the rubbing of each piece must be continued until it becomes nearly dry. The rubber may, for a second coat, be wetted with the varnish without oil, and applied as before. A third coat may also be given in the same manner; then a fourth, with a little oil, which must be followed, as before, with two others without oil; and thus proceeding until the varnish has acquired some thickness, which will be after a few repetitions, and depends on the care that has been taken in finishing the surface. Then a little spirit of wine may be applied to the inside of the rubber after wetting it with the varnish, and being covered with the linen as before, it must be very quickly and uniformly rubbed over every part of the surface, which will tend to make it even, and very much conduce to its polish. The cloth must next be wetted a little with spirit of wine and oil without varnish, and the surface being rubbed over with the precautions last mentioned until it is nearly dry, the effect of the operation will be seen; and if it be found that it is not complete, the process must be continued, with the introduction of spirit of wine in its turn, as directed, until the surface becomes uniformly smooth, and beautifully polished. The work to be polished should be placed opposite to the light, in order that the effect of the polishing may be better seen. In this manner a surface of from one to eight feet square may be polished at once, and the process, instead of being limited to the polishing of rich cabinets or other smaller works, can now be applied to tables and other large pieces of furniture with very great advantages over the common method of polishing with wax, oils, &c. In some cases it is considered preferable to rub the wood over with a little oil applied on a linen cloth before beginning to polish; but the propriety of this method is very much doubted. When the colour of the wood to be polished is dark, a harder polish may be made by making the composition of one part of shell-lac, and eight parts of wine, and proceed as before directed. For work polished by the French polish, the recesses or carved work, or where the surfaces are not liable to wear, or are difficult to be got at with the rubber, a spirit varnish made without lac, and considerably thicker than that used in the foregoing process, may be applied to those parts with a brush or hair pencil, as is commonly done in other modes of varnishing. French polish is not proper for dining tables, nor for anything where it is liable to be partially exposed to considerable heat.

NATURALISTS' CABINETS.

The cabinets made by the London workman generally contain 40 drawers, arranged in two tiers, and protected by folding doors of plain mahogany. This does not appear to us in good taste; for the whole immediately reminds one of a tent bedstead. Doors also, made entirely of wood, give a heavy and wardrobe-like appearance. Those in our principal cabinet have the centre covered with rich purple silk, defended by brass wire. The effect this produces on the eye is vastly superior, and the expense is rather less. The wood best adapted for cabinet drawers is mahogany or wainscot; but a combination of both in the inside work is, perhaps, the best. The drawers may be made of wainscot, and the outside of mahogany or other dark ornamental wood. Cedar should on no account be used; it exudes a resinous gum, which collects not only on the wood itself, but on the objects contained within, and inevitably spoils them. Whatever description of wood is used, it must be old and well seasoned.—*Swainson's "Treatise on Taxidermy."*

The Five Orders.



DORIC COLUMN—PALLADIO.

BOUQUET.

Our Father
Which art in heaven, Hallowed be thy Name. Thy kingdom come. Thy will be done in earth, as it is in heaven. Give us this day our daily bread. And forgive us our trespasses, As we forgive them that trespass against us. And lead us not into temptation: But deliver us from evil: For thine is the Kingdom, The power, and the glory, For ever and ever.
Amen

ECCLESIASTICAL TABLET.

Bistre.

THE phenomena exhibited in the process of distillation have only recently engaged that philosophic attention which their importance demands. The successive influences of heat upon one and the same body, producing substances alternately as various as soap, glycerine, and a violently escharotic fluid, afford one of the most interesting investigations of modern chymistry.

We are, we believe, indebted for the initiatory research into this department of experimental philosophy to Dr. J. Macculloch, Chymist to the Ordnance. That gentleman published in 1814, in the second volume of the "Transactions of the Geological Society," an elaborate paper on certain products obtained in the distillation of wood, in which he very clearly pointed out the influences of heat, at various degrees, in distillation. For instance, he shewed by experiment that the pitch from wood is decomposable by heat, successively, into oil, acetic acid, and finally charcoal — all dependent upon the degree of heat required. The principle of successive decompositions by heat has since been carried out on a magnificent scale in the soap and tallow manufactures. However, Dr. Macculloch's experiments resulted in several important modifications of existing processes connected with distillation, amongst which not the least important was the preparation of bistre, concerning which we give his own account.

"According to Dr. Lewis, bistre is produced from the soot of all wood; other receipt-books give us the same account, but limit the soot of wood to beech, without seeming aware of its real nature; but the colourmen use the soot of all wood indiscriminately.—Those artists who have made the tour of the Highlands of Scotland are well acquainted with that variety of it which varnishes the interior of a Highland cottage.—In all these cases, it is a very variable article, and the colourmaker, being unacquainted with its real nature, is unable to rectify its faults, in consequence of which it is often unfit for use, notwithstanding the various operose and mysterious purifications it undergoes in his workshop. The causes of these varieties will be very evident to those who have read the foregoing experiments [alluding to the gradations of heat explained above]. An imperfect separation of essential oil, and a consequent tenacity arising from its too near alliance to the tar, will appear to be its most common vice, and it is this which gives it that disagreeable gumminess and disposition to return to the pencil which is destructive of its best qualities. At times, also, from the same causes, it is offensively yellow. So valuable is a brown colour that will work freely and with transparency that the artists will be much obliged to him who shall render bistre equal in freedom and force to sepia. By distilling or evaporating the oil from the pitch with care and discrimination, a colour may be produced, varying in tone from the warmest bistre brown down to black. At the same time, the substance loses a great portion or the whole of its disagreeable tenacity, according to the degree of boiling it has undergone. By treatment in alcohol, results in some measure similar are produced, and the residuum of this solution is equal in colour to sepia, and totally devoid of tenacity. In either or both of these ways, may the quality of this colour be improved.

"The solution of bistre in lixivium of potassa or soda —a substance analogous to the resinous soaps—answers the purpose of ink, possessing a colour sufficiently intense, and flowing freely from the pen without requiring gum. As it is indestructible by time, by the common acids, or by the alkalies, perhaps it may be found a valuable substitute for this useful but fugacious substance. The compound of bistre and soda appears peculiarly well fitted for drawing in monochrome, since, as it does not consist of a powder suspended in a vehicle, it is free from the peculiar defects so well known to artists, which occur in colours thus compounded.

"I may also add that it forms a substitute for asphaltum in drying oil where such a coloured varnish is wanted, and that it makes a very good japan varnish for metal if dissolved in spirit of wine, and heated strongly after its application."

Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

BY FRANCIS BENJAMIN THOMPSON.

CHAPTER V. (*continued*).—INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Sulphur (concluded). One pound of sulphur produces about 3 lbs. of the strongest sulphuric acid of commerce. Sulphuric acid is considerably denser than any other acid or transparent fluid, and in general its affinities are stronger. It attracts water from the atmosphere very strongly, imbibing one-third of its weight in twenty-four hours, and more than six times its weight in twelve months. If four parts of sulphuric acid by weight be mixed with one of water at 50° F., they produce an instantaneous heat of 300° F. Arsenic is present in sulphuric acid to a great extent from the employment of pyrites (sulphurets of iron, copper, &c.) instead of sulphur in its fabrication. Pyrites invariably contain arsenic. Irish pyrites contain a great deal.

Sulphur forms four compounds with oxygen, namely:—

	Symbol.	Sulphur.	Oxygen.	Equivalent.
Hyposulphurous acid	S^2O^2	32	16	48
Sulphurous acid	SO^2	16	16	32
Hyposulphuric acid.....	S^2O^5	32	40	72

Sulphuric acid (see p. 62).

A solution of sulphurous acid (volatile vitriolic) in water, kept in a bottle imperfectly stopped, loses in a few days its peculiar smell, and becomes sour to the taste (spirit of vitriol). The solution of sulphuric acid (oil of vitriol) obtained in this manner is very weak, but it may be strengthened by boiling it down in a glass or porcelain vessel to a small bulk.

Sulphurous acid is used in bleaching, and its power of decolorisation may be evidenced by holding a red rose in the fume of a brimstone match. The flower will be turned perfectly white.

The character of hyposulphuric acid is that it is a transparent inodorous liquid, having a sour taste; it is incapable of existing independently of water; it may be

concentrated till its density amounts to 1·347; the attempt to concentrate it further decomposes it, resolving it into sulphurous acid gas, which escapes, and sulphuric acid which remains; it forms *soluble* salts with barytes, strontites, lime, and oxide of lead, and these characters distinguish it from sulphuric acid, which forms *insoluble* salts with the same bases.*

Sulphur combines with hydrogen, forming sulphuretted hydrogen (hydrosulphuric acid). Its symbol is HS, and its equivalent number 17. It is the well known gas, smelling like rotten eggs, which is the invariable accompanier of animal and vegetable putrescence. White lead spread upon paper and exposed to the influence of air containing 1-20,000th part of sulphuretted hydrogen, will shew a perceptible brown stain, which becomes blacker as the quantity of the gas is increased. It is much employed in detecting metals by forming sulphurets, whose colours are exceedingly well marked. For this purpose, it is prepared as follows:—

a Bottle containing mixture of sulphuret of iron and sulphuric acid; *b* funnel for pouring the acid; *c* small bottle, half full of water for washing the sulphuretted hydrogen gas disengaged; *d* is a larger bottle, three quarters filled with distilled water, which has been previously boiled to free it from air, and which must be as cold as possible. The disengagement must be continued until the water is saturated, which may be at once known, says Dr. Fresenius, by closing the mouth of the bottle *d* with the thumb, and strongly shaking the contents. If the thumb be gently pushed off, the water is saturated; if, on the contrary, it be sucked in, the disengagement must be continued. When a liquid has to be tested by a current of sulphuretted hydrogen gas, the same apparatus should be employed, substituting a beaker containing the liquid under examination for the bottle *d*.†

(To be continued.)

Correspondence.—"Clyde" (Glasgow).—We decline answering correspondents by letter. Our ordinary avocation demands quite enough of our chirography. A design for a painted window has been given. Waller and Son, Booksellers, Fleet Street, have a great many of Pickering's books. They may probably posse.s the "Sundry Draughts for Glaziers." We are about to give geometrical forms for ornamental windows.

*** Correspondents cannot be answered in less than a fortnight from the receipt of their letters.

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* Venables, "Man. of Chym."

† Dr. A. Normandy, Note to Rose's "Qualitative Analysis."

Pasteboard Models and Ornaments.

FIG. 1.

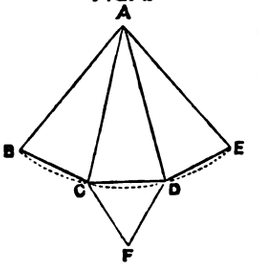
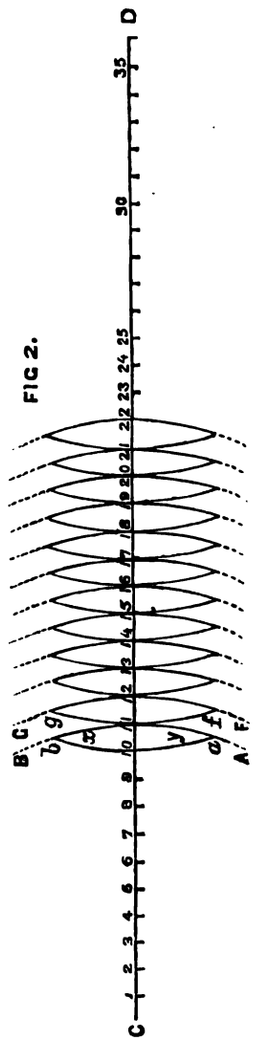


FIG 2.



The necessary tools are a very sharp shoemaker's paring-knife, a flat rule, an angular rule, and compasses. A scale rule, &c., will be required, of course, for architectural models.

To construct a Pyramid.—Describe from the point A (fig. 1), with the side AE, the arc of a circle, EB. Place in the arc the sides of the base ED, DC, CB, and draw the lines AE, AD, AC, AB; and likewise from one divisional point to the other; the straight lines ED, DC, CB, and DC in this case become the base.

The Cone.—This figure may be constructed as above, by omitting the divisions of the arc EB and all the other straight lines, except the bounding lines AE and AB, and describing a circular instead of an angular basis.

The Sphere. — To draw the flat figure of a ball, divide a straight line, CD (fig. 2), into about 36 parts. Place one end of the compasses in 1, and open them up to the 10th number, counting from 2, consequently 11. Describe through this divisional point the arc AB from 2, and, with the same opening, the arc FG through the twelfth divisional point; and so on, until 12 such arcs have been described. Then place one leg of the compasses in 20, and describe the arc *a b*, which intersects AB in *x* and *y*; describe from 21 the arc *f g*, which intersects FG in the same manner, and continue to describe 12 arcs more, which intersect all the others at the same distance from the straight line. These arcs of the flat figure are reckoned only from the straight line up to the points of intersection.

Cylinders should be formed upon rollers of hard wood.

We shall give occasional examples of the employment of these shapes in architectural and decorative modelling, &c.

Architectural Glossary.

(*Continued from page* 55.)

Arch Buttress, also called *flying buttress*, *arched buttress*, and *arched butment*, and by the French *arc-boutant*. An arched formed prop which connects the walls of the upper and central portions of an aisled structure with the vertical buttresses of the outer walls. It is most used in sacred edifices built in the pointed style.

Architrave (Greek *archein*, to govern, and Latin *trabs*, a beam). The lower of the three principal divisions of the entablature. "Also the ornamental moulding running round the exterior curve of an arch, and hence applied to the mouldings round the openings of doors and windows, &c."—(*Gloss. of Arch.*). With regard to these latter, the lintel, or upper part, is designated the *traverse*, and the sides are called *jambs*. An entablature may consist of an architrave and cornice only, without the interposition of a frieze. Gwilt says, "It (the *architrave cornice*) is never used with columns or pilasters, unless through want of height. It is, however, allowable."

Archivolt (Latin, *arcus volutus*). A group of concentric mouldings decorating the inner contour of an arch, and bearing upon the imposts.

Asarotum.—A species of painted pavement used by the Romans before the invention of mosaic work.—*Gwilt.*

Astragal (Greek). A semicircularly profiled moulding, of small dimensions, sometimes called a *roundel*. It surrounds the top or bottom of a column in the form of a ring, representing a ring or band of iron, to prevent the splitting of the column. It is often cut into beads or berries, and is used in ornamented entablatures to separate the several faces of the architrave.

Atlantes. Male caryatides (which see).

Baguette (French). A kind of astragal, called a *baguette* when plain, and a *chaplet* when ornamented.

Balcony (Italian, *balcone*). A projection from a house, supported by columns, pillars, or consoles, and guarded by a railing.

Balection, Bilection, or Bolection Mouldings. Mouldings which project beyond the surface of a piece of framing.

Ball Flower. An ornament resembling a ball placed in a circular flower, the three petals of which form a

cup round it. This ornament is usually found inserted in a hollow moulding, and is generally characteristic of the decorated style of the 14th century. [*Note.*—"This ornament appears to deserve rather the name of hawk's bell, to which it bears considerable resemblance. It is by many supposed to be intended for the pomegranate, and to have been introduced into England in compliment to Queen Eleanor. It is comparatively seldom found in France."]—*Gloss. of Arch.*

Baluster (French, *balustre*). A small column or pilaster belonging to a balustrade. It is either plain or ornamented.

Balustrade. A row of balusters joined by a rail.

Band. A square, flat, large moulding. Bands are used on the shafts of pillars in Gothic architecture.

Base. The part between the bottom of a column and the plinth.

Bas Relief or Basso Relievo. Sculpture in which the figures project less than half their true proportions from the wall on which they are carved.

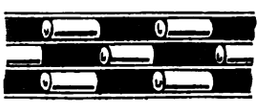
Battlement. An indented wall. When the wall has a double row of battlements it is designated *battle-embattled*.

Bay Window. A window projecting outwards from an apartment. Very frequent in the Elizabethan style.

Bead. A small moulding of round section. "When the bead is flush with the surface, it is called a *quirk bead*, and when raised, it is called a *cock bead*."

Bell of a Capital. The plain basket of the Corinthian and Composite orders, divested of the acanthus. Also the vases of several Gothic styles, having circular chapters.

Billet Moulding. A moulding much used in Norman architecture.



(*To be continued.*)

Technicologia.

152. *To Preserve Sea-weeds.*—Throw the collected sea-weeds into a basin of fresh water, into which salt, in the proportion of a teaspoonful to a quart, has been infused. Cut pieces of writing-paper, or thin Bristol-board, to the size required for the book or portfolio about to be formed; take a quire of blotting-paper and cut that up into rather larger pieces than the others, and allow at least eight portions of blotting-paper to every one of writing-paper. Have a dish half full of fresh water; take one specimen at a time from the basin and immerse it in this water, then take a piece of writing-paper and slide it under the weed, gradually bringing it up closer and closer to this latter with one hand, while with a camel-hair pencil in the other you float the weed out, and diffuse it so as to shew almost every portion of it; now gently raise the paper out of the water, and gradually slant it so as to drain off the superabundant moisture; if any portions of the weed do not lie smoothly or gracefully, dip a finger in the water, and let fall a drop or two on them, and again gently touch with the brush; in the case of some of the finer and more delicate specimens, the filaments cling and heap together, and often require the aid of a needle to separate them properly, and repeated droppings of water to float them into an easy and natural position. When this is satisfactorily achieved, lay the paper on five or six pieces of blotting-paper, stretch a piece of clear muslin over the specimen, and then put four or five more pieces of blotting-paper on it, and then a heavy weight; several specimens may be put one on the other, if from ten to a dozen thicknesses of blotting-paper are laid between each. Leave it thus for twenty-four hours, and then very carefully remove the weight and take away the blotting-paper and muslin and dry it or replace it by fresh, taking care not to disturb the specimen in the *least degree*. In about three days, if the weather is favourable (not damp), the specimen will be perfectly dry and ready for insertion in the book; it will retain its colour for years, and is in a manner incorporated with the paper on which it lies. To those, however, who may

not have time or patience to wait the natural course of drying, we may mention that a heavy heated flat-iron pressed on the folds of blotting-paper, forms a more expeditious means of getting rid of the moisture, and if carefully managed, impairs the hue of the specimens but little. We must remark that the method of proceeding above described is applicable only to thin, fine, and delicate weeds, as the Landscape-weed (*Plocarnium coccineum*), the Dock-leaved or blood-coloured Fucus (*Delessaria sanguinea*) the varieties of the *Nitophyllum*, the Scarlet Dasya (*Dasya coccinea*), Sea-hair (*Sertularia operculata*), and such like. The varieties of Dulse, of Desmarestia, of large mosses, and of Laminaria, must be soaked first in salt and water, then laid out on a table or board, and every portion of that which is to be the under side passed over with a camel-hair pencil dipped in a solution of gum-dragon; the gummed side must then be applied to the paper destined for the specimen, and the after-process is the same. The Sea-fir (*Sertularia Abietina*) will answer well, treated in this manner.

153. *Birch Oil.*—This valuable oil is made by distilling 20 pints of birch bark with one of ledum palustre, crammed in layers into an earthen pot with a handful of tripoli betwixt each layer. The mouth of the pot is closed with a perforated oaken plug, and being inverted, is luted to the mouth of another pot sunk in the ground. The upper pot being then surrounded by fire, a brown empyreumatic oil is distilled *per decensum* into the lower jar. An eight gallon pot, properly filled, yields from 2 to 2½lbs. of oil. In Siberia it is prepared without the ledum, which imparts a rosy smell. This oil is liquid when fresh, but grows thick in time. It is used for currying the well known Russia leather, and might profitably be more variously applied. It is infallible against dust and insects.

154. *Oil Paints.*—Make a solution in water of a metallic salt, such as sulphate of copper, sulphate of iron, &c. Have ready another watery solution of common soap, and mix both together. The acid of the metallic salt will combine with the alkali of the soap, and the metallic oxide in combination with the oil will be precipitated. Copper will give a green colour, iron a rich brown, &c.

SIMPLE IMITATION OF NATURE.

If an artist, in whom we must of course suppose a natural talent, in the first stage of progress, after having in some measure practised eye and hand, turns to natural objects, uses all care and fidelity in the most perfect imitation of their forms and colours, never knowingly departs from nature, begins and ends in her presence every picture that he undertakes, such an artist must possess high merit, for he cannot fail of attaining the greatest accuracy, and his work must be full of certainty, variety, and strength. If these conditions are clearly considered, it will be easily seen that a capable but limited nature can in this way treat agreeable but limited subjects. Such subjects must always be easy to find. They should be seen at leisure, and quietly imitated; the disposition that occupies itself in such works must be a quiet one, self-contained, and satisfied with moderate gratification. This sort of imitation will also be practised by men of quiet, true, limited nature in the representation of dead or still-life subjects. It does not by its nature exclude a high degree of perfection.—*Goethe.*

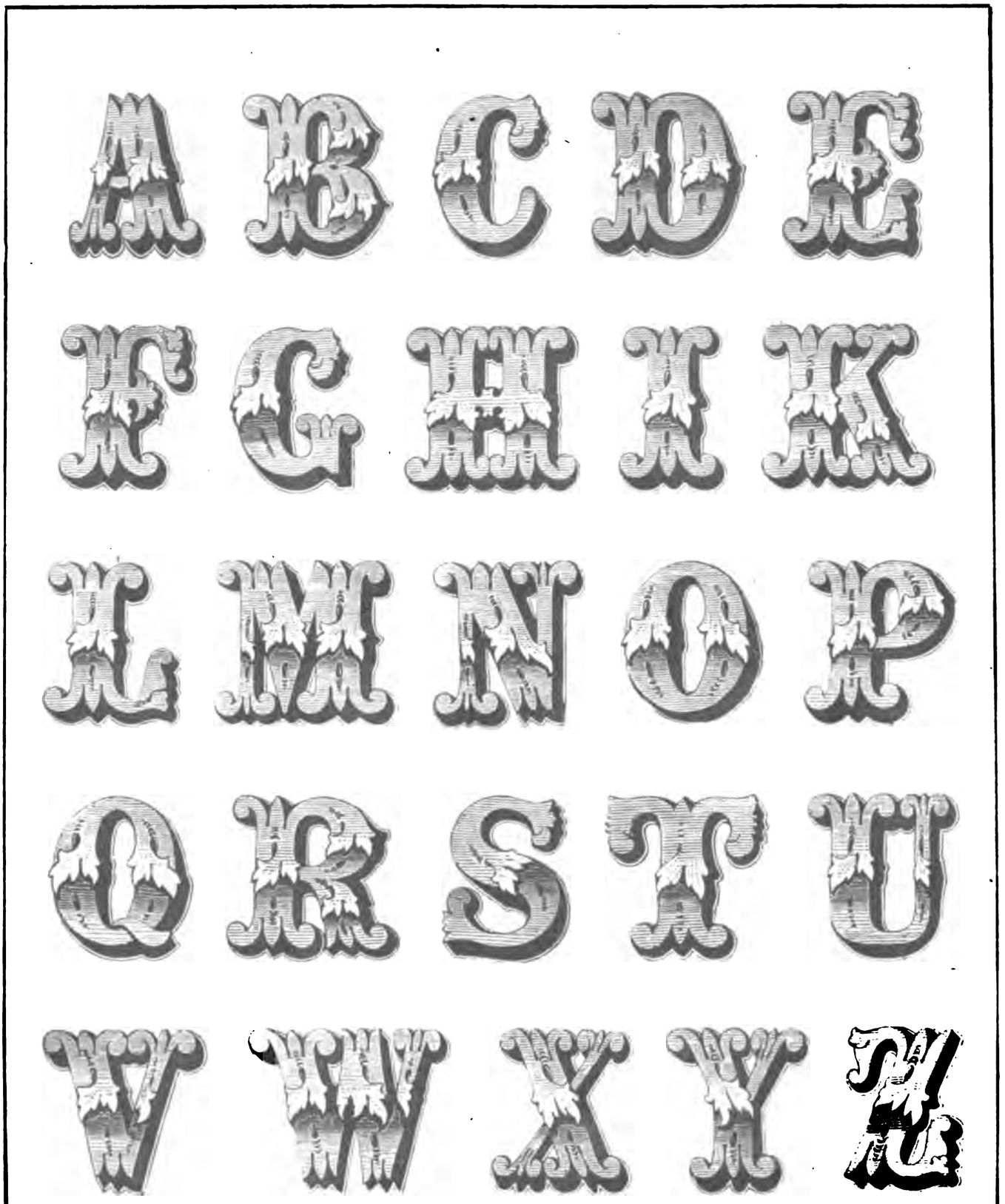
ENGLISH GLASS IN THE LAST CENTURY.

Sir Richard Steele, in his "Lover" (No. 34), speaking in terms of admiration of Gumley's Glass Gallery, over the New Exchange, says—"When a man walks in that illustrious room, and reflects what incredible improvement our artificers of England have made in the manufacture of glass in thirty years' time, and can suppose such an alteration of our affairs in other parts of commerce, it is demonstrable that the nations who are possessed of mines of gold are but drudges to a people whose arts and industry, with other advantages natural to us, may make itself the shop of the world. We are arrived at such perfection in this ware of which I am speaking, that it is not in the power of any potentate in Europe to have so beautiful a mirror as he may purchase here for a trifle by all the cost and charge that he can lay out in his dominions. It is a modest computation that England gains £50,000 a year by exporting this commodity for the service of foreign nations—the whole owing to the inquisitive and mechanic, as well as liberal, genius of the late Duke of Buckingham. This prodigious effect by the art of man from parts of nature that are as unlikely to produce it as one would suppose a man could burn common earth to a tulip, opens a field of contemplation, &c." In the year 1670, some Venetian artists, the principal of whom was Rosetti, arrived in England, under the patronage of the Duke of Buckingham, who established the manufactory of Fox-Hall (Vauxhall), in the parish of Lambeth, and carried it on with amazing success, in the firm of Dawson, Bowles and Co., so as to excel the Venetians or any other nation in blown plate glass. The emoluments acquired by the proprietors were prodigious till about 1781, when a total stop was put to this great acquisition, and a descendant of Rosetti ungratefully left in extreme poverty ("Hist. of Lambeth," 1786, p. 120).

ARCHITECTURAL ORTHODOXY.

For restorations or exact fac-similes of buildings, whether classical or mediæval, the very form as well as the spirit of the ornaments contemporaneously used in such buildings should be most strictly adopted. An imitation, unless it is an exact one, is good for nothing, as far as architecture is concerned. But should we prevail on ourselves either to depart from these styles or to carry out their main principles, so as to form a national style of our own,—not a fixed one, but a style varying through different ages, suiting itself to the social requirements of each,—then we should be prepared not only to call in the aid of natural beauty to the fullest extent, but also to avail ourselves of all that rich fund of form which results from the extensive use of scientific knowledge and the investigation of physical curves. There is no reason why such a style, or succession of styles should not be formed, if the great principles of science and utility be taken as the substructure on which imagination may afterwards raise its enrichment; and if ever it come into existence, we have the unlimited expanse of the universe to range through in search of beauty and harmony. Why should the Greek and Roman ovolo, cavetto, and square be the only combination that we know of in our common mouldings. How much richer were the architects of the 13th and 14th centuries; who drew with "free hands," and gave us such exquisite effects of light and shade! We are firmly persuaded that an architect deeply imbued with the scientific principles of his profession and endowed at the same time with the hand and the eye of a skilful artist, may cause a most happy and useful reformation of our national architecture.—*Blackwood's Magazine*, 1846.

PANEL.



ALPHABET—FLORID.

Enamelling on Metals.

THERE are two kinds of enamel, the opaque and the transparent. Transparent enamels are usually rendered opaque by adding putty or the white calx of tin to them. The basis of all enamels is, therefore, a perfectly transparent and fusible glass. The oxide of tin renders this of a beautiful white, the perfection of which is greater when a small quantity of manganese is likewise added. If the oxide of tin be not sufficient to destroy the transparency of the mixture, it produces a semiopaque glass, resembling the opal.

Yellow enamel is formed by the addition of oxide of lead or antimony. Kunckel likewise affirms that a beautiful yellow may be obtained from silver.

Red enamel is afforded by the oxide of gold, and also by that of iron. The former is the most beautiful, and stands the fire very well, which the latter does not.

Oxide of copper affords a green; manganese, a violet; cobalt, a blue; and iron, a very fine black. A mixture of these different enamels produces a great variety of intermediate colours, according to their nature and proportion. In this branch of the art, the coloured enamels are sometimes mixed with each other, and sometimes the oxides are mixed before they are added to the vitreous bases.

The enameller, who is provided with a set of good colours, is very far from being in a situation for practising the art, unless he be skilled in the methods of applying them, and the nature of the grounds upon which they are to be laid. Many of the metals are too fusible to be enamelled, and almost all of them are corroded by the action of the fused glass. For this reason, none of the metals are used but gold, silver, and copper. Platinum has indeed been used; but of its effects and habitudes with enamels very little can be said, for want of a sufficient number of experiments.

The purest gold of 24 carats is calculated to produce the best effect with enamel. 1. Because it entirely preserves the metallic brilliancy without undergoing any oxidation in the fire. 2. Being less fusible, it will admit of a more refractory, and consequently a harder and more beautiful enamel. It is not usual, however, to enamel upon finer gold than 22 carats; and the operation would be very defective, if a coarser kind than that of 18 carats were used. For in this case more alkali must be added to the enamel to render it more fusible, and this addition would at the same time render it softer and less brilliant.

The following description is given by way of example, of fixing a transparent blue enamel upon gold of 22 carats.

The artist begins his operation by breaking the enamel into small pieces in a steel mortar, and afterward pulverising it in a mortar of agate. He is careful to add water in this part of his process, which prevents the splinters of glass from flying about. There are no means of explaining the point at which the trituration ought to be given up, as this can be learned only by experience. Some enamels require to be very finely triturated; but others may be used in the form of a coarse powder. As soon as he finds that his enamel is sufficiently pounded, he washes it by agitation in very clear water, pouring off the fluid as it becomes turbid. This operation, which is for the purpose of carrying off dust and every other impurity from the enamel, is continued until the water comes off as clear as it was poured on.

The workman puts his enamel, thus prepared, in a white china or earthen saucer, with water poured on it to the depth of about one-tenth of an inch. He afterwards takes up this enamel with an iron spatula, as equally as possible. As the enamel here spoken of is transparent, it is usual to ornament the surface of the gold with rose work or other kind of decoration, calculated to produce a good effect through the enamel.

The thickness of this first layer depends entirely upon its colour; delicate colours, in general, require that it should have no great thickness.

The moist enamel, being thus placed, is dried by applying a very clean half-worn linen cloth to it, which must be very carefully done, to avoid removing the enamel by any action of wiping.

In this state the piece is ready for the fire. If it be enamelled on both sides, it is placed upon a tile, or iron plate, hollowed out in such a manner that the uncovered edges of the piece alone are in contact with the support. But if it be enamelled on one side only, it is simply laid upon the plate, or on a tile. Two things, however, require to be attended to. 1. If the work be very small, or not capable of being enamelled on its opposite side, the iron plate must be perfectly flat, in order that the work may not bend when softened by heat. 2. If the work be of considerable size, it is always counter-enamelled if possible; that is to say, an enamel is applied on the back surface, in order to counteract the effect which the other coating of glass might produce on the soft metal, when it came to contract by cooling.

The enameller's furnace is square and built of bricks, bedded in an earth proper for the purpose. It may be considered as consisting of two parts, the lower part, which receives a muffle, resting on the floor of the furnace, and open on both sides.

The upper part of the furnace consists of a fire-place, rather larger and longer than the dimensions of the muffle. This fire-place contains the charcoal, which must surround the muffle on all sides, excepting at the bottom. The charcoal is put in at a door above the muffle, which is closed when the fire is lighted. A chimney proceeds from the summit of the furnace with a moderate aperture, which may be closed at the pleasure of the artist, by applying a cast iron plate to it. This furnace differs from that of the assayer in the circumstance, that it is supplied with air through the muffle itself; for, if the draught were beneath the muffle, the heat would be too strong, and could not be stopped when requisite.

As soon as the fire is lighted, and the muffle has obtained the requisite degree of ignition, the charcoal is disposed towards the lower part of the muffle in such a manner, as that it shall not fall upon the work, which is then conveyed into the muffle with the greatest care upon the plate of iron or earthenware, which is taken up by long spring pincers. The work is placed as near as possible at the farther extremity of the muffle; and as soon as the the artist perceives a commencement of fusion, he turns it round with great delicacy, in order that the fusion may be very uniform. And as soon as he perceives that the fusion has completely taken place, he instantly removes it out of the furnace; for the fusion

of gold happens so very near that of the enamel, that a neglect of a few seconds might be attended with considerable loss.

When the work is cooled, a second coat of enamel is applied in the same manner as the first, if necessary. This, and the same cautious management of the fire, are to be repeated for every additional coat of enamel the nature of the work may demand.

As soon as the number of coatings are sufficient, it becomes necessary to give an even surface to the enamel, which, though polished by the fire, is nevertheless irregular. This is done with a fine-grained file and water. As the file wears smooth, sand is used. Much precaution and address are required in this part of the work, not only because it is easy to make the enamel separate in splinters from the metal, but likewise because the colour would not be uniform if it were to be ground thinner at one part than at another.

The deep scratches of the file are in the next place taken out, by rubbing the surface with a piece of deal wood and fine sand and water. A polish is then given by a second ignition. This polish, however, is frequently insufficient, and not so perfectly uniform as the delicacy of the work may require.

The substance used by the enamellers, as a polishing material, is known by the name of rotten-stone; which is prepared by pounding, washing, decanting off the turbid water, suffering the fine suspended particles to subside from this water, and lastly levigating it upon a glass plate.

The work is then cemented to a square piece of wood with a mixture of resin and brick-dust, and by this means fixed in a vice.

The first operation of polishing is made by rubbing the work with rotten-stone upon a small straight bar of pewter. Some delicacy is here required, to avoid scratching or producing flaws in the enamel, by pressing it too hard. In this way the piece is rendered perfectly even; but the last brilliant polish is given by a piece of deal wood and the same rotten-stone.

This is the general method of applying enamels; but some colours require more precaution in the management of the fire. Opaque colours require less management than the transparent. A variety of circumstances must be attended to in the management of transparent colours; every colour requires gold of a particular fineness.

When different colours are intended to be placed beside one another, they are kept separate by a small edge or prominency, which is left in the gold for that purpose, and is polished along with the enamel.

The enamelling upon silver is effected nearly in the same manner as that of gold; but the changes sustained by the colours upon the silver, by the action of fire, are much more considerable than when gold is used.

Copper is not much used by enamellers, on account of the difficulty which attends the attempt to fix beautiful colours upon it. When this metal is used, the common practice is to apply a coating of opaque white enamel, and upon this other colours, which are more fusible than the white.

A good effect is produced in toys, by leaving part of the gold bare. For this purpose its surface is cut into suitable compartments by the engraver. This, however, is an expensive method, and is for this reason occasionally imitated by applying small and very thin pieces of gold upon the surface of the enamel, where they are fixed by the fire, and afterwards covered by a transparent vitreous coating.

Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

By FRANCIS BENJAMIN THOMPSON.

CHAPTER V. (*continued*). — INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Selenium (symbol Se, equivalent 39·686, equivalent according to M. Dumas 40·000, sp. gr. granular, 4·796 to 4·805, vitreous, 4·276 to 4·286).

Selenium is a friable brown solid substance, of semi-metallic appearance. At the ordinary temperature it is odourless and tasteless, but on the application of heat, it evolves a strong smell of horseradish. It is insoluble in water, but melts at a few degrees above its boiling point. It boils at 600° F. It occurs in iron pyrites. It is a rare substance, without much use beyond the purposes of testing.

Seleneous acid, selenic acid (symbol SeO^2, equivalent 55, sp. gr. 2·524 to 2·600), and seleniureted hydrogen are its most familiar forms.

Boron (symbol B, equivalent 10·914, sp. gr. about 2·000 [Dr. Reid], equivalent according to M. Dumas [1858] 11·000).

Heat to redness (about 302° F.) equal parts of potassium and pure boracic acid. The potassium will disappear, and the residuum will be boron.

Boron burns in the open air at 600° F.; but no amount of heat affects it when kept in close vessels. Combustion always converts it into boracic acid.

In 1857, MM. Wöhler and Deville discovered that boron can exist in three states, exactly corresponding to those of carbon, namely, the amorphous, the graphitic, and the crystal. To obtain the latter 3¼ ozs. of boracic acid and 80 of alumina are exposed for five hours to an intense fire in a black lead crucible coated with charcoal powder. The mass is then left to cool; and on breaking the crucible, two distinct strata are exposed—one consisting of vitrified boracic acid, containing some alumina, and the other of aluminium in a metallic state, mingled with crystals of boron. To separate the latter, this metallic mass is treated with boiling caustic soda, to dissolve the metal; then with boiling hydrochloric acid, to carry off the iron which may have been separated from the carburet of iron of the crucible; and lastly with a mixture of nitric and hydrochloric acids, to dissolve the silica left by the soda. After this, the boron is obtained pure in three varieties of crystals:—1. Black and opaque laminæ, which will cut diamond, though not so well as diamond powder. 2. Long prismatic crystals, perfectly transparent, and as brilliant as diamonds, but not so hard as the former variety. 3. Very minute but distinct crystals of a red chocolate colour, quite as hard as diamond.

Boracic acid (symbol BO^3, equivalent 26).

Boracic acid is without smell or taste, sparingly soluble in water, and its solution reddens vegetable blues, besides reddening turmeric like an alkali. It is soluble in alcohol, and the solution, set on fire, burns with a splendid green flame.

It is prepared from borax by dissolving 152 parts of the latter in hot water and adding 40 of sulphuric acid. Borax 152 = boracic acid 48 + soda 32 + water 72. The boracic acid separates in crystals as the water cools: 72

sulphate of soda remain in solution. To absolutely purify the crystals, they must be fused in a platinum crucible, redissolved, and recrystallised.

Boracic acid has been found by M. Tissier to act as a powerful solvent upon several bodies which are insoluble or sparingly soluble in water, such as lime, magnesia, alumina, protoxide of manganese, protoxide and sesquioxide of iron, protoxide of zinc, the carbonates of baryta, lime, and magnesia, and finally phosphate of lime.

In the volcanic regions of Monte Cerboli, in Tuscany, are some remarkable boiling lakes that produce a daily harvest of from 7,000 to 8,000 lbs of boracic acid. It also exists in the hot springs of the Lipari Islands.

Borax is the biborate of soda, the qualities of the alkali predominating, although there are two equivalents of acid combined with it.

As a blowpipe flux, borax has been considerably supplanted by microcosmic salt, which is a phosphate of soda and ammonia.

The druggists keep two sorts of borax, one crude and the other refined for medicinal purposes. The crude description is called *tincar** in the trade, and serves for fluxing and soldering. Borax is thus refined:—The tincar is dissolved in water and the solution boiled for a considerable time. It is then filtered and allowed to cool and crystallise.

Borax mixed with shell-lac, in the proportion of one part to five, renders the lac soluble by digestion in water a few degrees below boiling point.

Borax is principally obtained in Thibet.

(To be continued.)

AN UNEXPECTED OVERSEER.

As Mr. Cundy, the builder, will testify, Dr. Buckland looked very sharply after the masons when repairing Westminister Abbey, or any other of the Collegiate buildings in which he had any interest, examining the various kinds of cements, the blocks of building stone, the means adopted to repair and keep in order the regal and other monuments, and taking special care that no faulty bits of stone, &c., were used. Many years ago, when the turrets of "Tom Tower," of Christ Church, Oxford, were undergoing repairs during the long vacation, he had reason to suspect that all was not right. It was almost impossible for him to ascend by the slender scaffolding to these turrets; so from the window of his house (he was then Canon of Christ Church) he bethought him of watching the masons through the telescope (a very good one, with which he used to examine distant geological sections, &c.). At last, the unsuspecting mason, working, as he thought, far above the ken of man, put in a faulty bit of stone; my father, on the look-out below, detected him through the telescope, and almost frightened the man out of his wits when, coming out into the quadrangle, he admonished him to bring down directly "that bad bit of stone he had just built into the turret."—*Memoir of Dean Buckland, by his Son.*

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* This is the spelling according to Gray's "Supplement to the Pharmacopœia," and may probably be the technical expression, but the Indian name under which it is imported is *tincal*.

Technicologia.

155. *Fusibility of the Metals.*—Fusible below a red heat: mercury 39° F., potassium 136, sodium 190, tin 442, cadmium 450, bismuth 497, lead 612, tellurium rather less fusible than lead, arsenicum undetermined, zinc 773, antimony little below redness. Infusible below a red heat: silver 1873° F., copper 1996, gold 2016, iron (cast) 2786, iron (malleable) and manganese require the highest heat of a smith's forge; cobalt and nickel rather less fusible than iron. Almost infusible, and not to be procured in buttons by the heat of a smith's forge, but fusible before the oxyhydrogen blowpipe: palladium, molybdenum, uranium, tungsten, chromium, titanium, cerium, osmium, iridium, rhodium, platinum, columbium.

156. *Method of setting Sun-dials.*—For the use of those who may be desirous of fixing or rectifying a sun-dial, the following method of accomplishing this object is appended, which only requires the use of a good watch that will keep time for six hours. Care must be taken, in the first place, that the pillar on which the dial is to be placed is perpendicular to the horizon, which is easily proved by the plumb-line. Then ascertain, by means of the spirit-level, that the upper surface is perfectly horizontal; and if so, screw on the plate loosely by means of the centre screw, and bring the gnomon as nearly as possible to its proper direction. On a bright day set the watch exactly with the dial at nine o'clock in the morning, and at three in the afternoon observe the difference between them, and correct the dial to half the difference. Proceed in the same manner till the watch and dial are found to agree perfectly. Then fix the plate firmly in that situation, and the dial will be correctly set. This is obvious, for if there were any defects, the sun's shadow would not agree with the time indicated by the watch, both before and after he passed the meridian. Take care, however, to allow for the equation of time, or you may set the dial 16 minutes wrong. The best day in the year to set a dial is the 15th of June, as there is no equation to allow for, and no error can arise from change or declination. A dial may be set without a watch, by drawing a circle round the centre, and marking the spot where the top of the shadow of an upright pin or piece of wire, placed in the centre, just touches the circle in the morning and again in the afternoon. A line should be drawn from one spot to the other, and exactly bisected; then a line drawn from the centre of the dial through that bisection will be a true meridian line, on which the XII hours' mark should stand.

GOLD LEAF.

By the weight and measure of the best wrought gold-leaf, it is found that one grain is made to cover 56¼ square inches; and from the specific gravity of the metal, together with this admeasurement, it follows that the leaf itself is $\frac{1}{282,000}$ part of an inch thick. This however, is not the limit of the malleability of gold; for the goldbeaters find it necessary to add three grains of copper in the ounce to harden the gold, which otherwise would pass round the irregularities of the newest skins, and not over them; and in using the old skins, which are not so perfect and smooth they proceed so far as to add 12 grains.

WEIGHT OF THE GREATEST CHURCH BELLS.

	lbs.
Empress Ann, Moscow	432,000
St. Ivan's, Moscow	142,000
Great Bell, Pekin	120,000
Novogorod, Russia	70,000
Vienna, cast from Turkish cannon	40,200
Amboin's Bell, Rouen	40,000
Erfurt, Saxony	30,800
Cologne, Germany	25,000
Verdun, France	24,000
Exeter Cathedral	17,472
Great Tom of Oxford	17,360
Antwerp Cathedral	16,000
St. Paul's, London	11,470
Ghent Cathedral	11,000
Great Tom of Lincoln	10,854
Canterbury Cathedral	7,840
Gloucester Cathedral	6,000
York Cathedral	6,384
Bow Bell, London	5,800
Beverley, Yorkshire	5,600
Spitalfields, London	4,400

Bells originated in Italy, Paulinus, Bishop of Nola, first having introduced them in Campania, about the year 400.—*Conversations Lexicon.* Introduced into France about 550, and into Britain soon after their invention; first mentioned by Bede at the close of the seventh century.

ULTRAMARINE.

This is the blue pigment made from lapis lazuli. The manipulations for preparing it are variously described by different authors, and consist in finely pulverising the stone, by subjecting it to a strong heat, the quenching it suddenly in vinegar or water, and finally levigating the mass. This powder is then carefully stirred in minute portions into a resinous composition, from which it is subsequently extracted by washing and kneading in hot water. Perfect cleanliness is essential. Some artists merely use the rough powder. The following account of the preparation of ultramarine from the lapis lazuli ore, appeared half a century since in the *Annales de Chimie*, written by MM. Clement and Desormes—long before the grand invention of its splendid imitation saw the light:—"To extract the ultramarine from its ore, a process is employed to which art offers nothing analogous, and of the theory of which we are totally ignorant. This process consists in levigating the lapis lazuli, and mixing it well with a melted composition of resin, wax, and linseed oil. When these are thoroughly mixed, the compound is suffered to cool, and then well ground, with a pestle or roller, in warm water. This water, becoming turbid, is thrown away, and fresh substituted, which is soon perceived to acquire a fine blue tint. When this is sufficiently loaded with the colouring matter, it is put by to settle, and more water is taken, which likewise assumes a blue colour, but less intense than the former. This is repeated until the water only acquires a dirty gray hue. From these waters a powder is deposited, which is so much the more beautiful in proportion as the lapis lazuli was more rich, and according to the order in which the water forming it was employed. The gangue* of the ultramarine remains behind in the sediment."

* *Gangue*, the matrix of an ore.

PAINT AND POLISH.

Novelists make a favourite theme of the shining floors and glossy wainscots of our ancestors, whilst the employment of pigments seems scarcely to have engaged their notice. The cause of this partiality is, we think, associated with a very important though ill-studied predilection, which gives preference betwixt works of art to those which bear most evidence of loving labour—a characteristic not generally exhibited in house-painting. Indeed, many circumstances combine to deteriorate the effect of painted decoration in the eye of an æsthetical beholder, not the least of which is, that the primary object of its use is to conceal defects of material, if not of workmanship. Now, polishing is essentially a conscientious employment, in which a natural effect is sought to be heightened by a vigorous application of elbow grease. It does not admit of artifice like painting. In the one you may be deceived as to the number of coats laid upon a wall, but in the other, there is no middle course between perfection and positive neglect. We fear that we have lost much of that industrious spirit to which the Elizabethans owed the brilliancy of their furniture; but still more do we fear that mercenary feeling of the age that has brought about the nearly universal substitution of soft wood in place of the sound hard oak and walnut, that were capable of appearing beautiful without paint, and the loss of which has deprived us of so many substantial advantages.

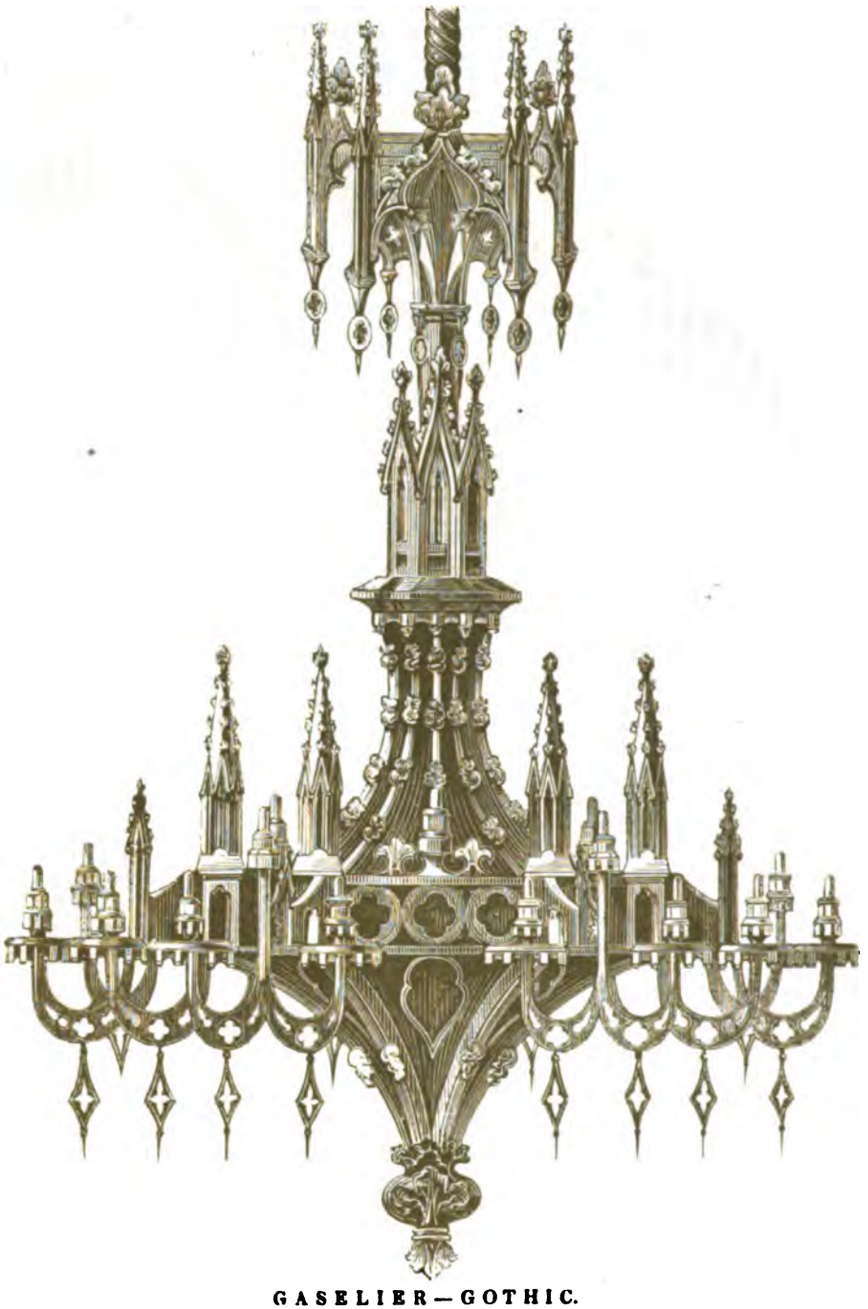
A ROMAN CONNOISSEUR.

After the taking of Corinth by Mummius, a great number of admirable pictures and statues by the best masters came into his hands. These he ordered his servants to convey to Italy, at the same time warning them that if they lost any by the way, they should certainly *find new ones in their place.*

GLASS PAINTING.

The Egyptian and Assyrian remains shew a great perfection attained in the imitation of gems by means of silicates of different metallic oxides; and from Egypt the art was brought into Phœnicia. Although Pliny fixes the epoch of the introduction of glass workshops into Rome in the reign of Nero, yet it is probable that glass windows were known before that time; as when Nero had constructed the temple of Seïa of rock-crystal, the phenomenon of the refraction of light which the interior exhibited was remarked by those who witnessed it as being different to transmitted light, with which they were acquainted; while at Pompeii baths have been found furnished with windows of white glass, as pure as our own. The introduction of glass windows is therefore of much more ancient date than the end of the third century, to which period it is generally attributed. Eraclius, who wrote about the time of Charlemagne, speaks of the means of producing a picture upon glass by grinding Roman glass—probably of various colours, of which Pliny writes—upon porphyry, and painting upon a *page* or *scroll* of fictile or glass-work with gum-water; these were then placed in the furnace. The same author also describes a white glass, or flux, for the purpose of painting upon glass, and was acquainted with the use of lead in rendering glass more fusible.

ECCLESIASTICAL LAMP.



GASELIER—GOTHIC.

Universal Infidelity in Principles of Design.

UR potters illustrate every known style of the manufacturer. Some delight in Etruscan shapes and colours, others take the bronzes of Pompeii for their model. The influence of China is of course prominently seen, and mediæval art also showers down its suggestions. Then we have bad imitations of Sèvres and worse of Dresden. Every day we are adding to the number of our reproductions; and, no sooner is Parian introduced for modelling statuettes, than Cupids are perpetually smiling at us under glass shades, or sitting in very uncomfortable attitudes upon projections of dishes, or balancing themselves miraculously upon the summits of lids. But pottery is by no means the only or the most flagrant case of this imitative rage. Take carpets. Here partly, probably, in obedience to the dictates of the Berlin wool-workers, and partly in deference to the tastes of the Brussels and French makers, we have got into a habit of covering the floor we tread upon with a luxuriance of vegetation and a lavish expenditure of colours which it is quite wonderful quietly to contemplate:—flowers, and leaves, and fruits, of a size such as was never seen in this world before, and we conscientiously hope may never be seen in this world again. Our eyes are dazzled and perplexed by moss-roses that give us headaches with their brightness, and we wonder how we could ever make up our minds to walk over a material so decorated. The uses of a carpet are no mystery, and any sensible person who examines the subject will have no great difficulty in deciding what style of ornament is unsuitable for such an article. In the first place, he will say, make your carpet the background for setting off your furniture appropriately and well. Now, is that to be done by broad and startling contrasts of colour, which are constantly drawing the eyesight painfully downwards, instead of allowing it to rest agreeably upon other objects? Again, no one will contend that flowers represented as real, and fruit rounded off so that you are tempted to stoop down and gather it, and vegetation that threatens the foot with hopeless entanglement, are proper designs to tread upon. Yet that is what not only England, but all Europe, does in this matter—and why? Because when tapestry became no longer useful, the love of large patterns and real effects which it suggested were imported into carpet-making, while the monstrosities of Berlin wool-work came in aid of the mania. The English carpets have imitations of India, of Brussels, of French, of parqueterie and tessellated pavements, and of the mediæval style of manufactures. In one article that is a pretty long list of reproductions, and reminds us that in industry, as in the drama, we are rather addicted to borrowing other people's ideas, and not very choice in the selection of them. Let us take another branch of production, where it seems less likely that we could err. It is that of grates, lamps, candelabra, chandeliers, candlesticks, and such-like objects, for the heating and illumination of our dwellings. In these undoubtedly there are a few very fine productions, and with respect to some of them our pre-eminence is undoubted; but let any person of ordinary taste examine a few manufacturers' collections carefully, and he will retire from the survey with a painful impression of the ignorance displayed in the use of really beautiful materials. He will find grates, exquisite in the quality of their workmanship, but totally unsuited for the uses they are intended to serve, which must necessarily break the hearts of servants in the effort to keep them clean, with Greek, Gothic, Moorish, and Elizabethan architectural arrangements introduced which are totally unnecessary, and figures of human beings in unhappy proximity to an element which must inevitably destroy them. The English manufacturer never abandons the idea of vegetation, and wreaths of fruits and flowers that would puzzle the horticultural acumen of Paxton himself are fearlessly suspended over the receptacle for the glowing embers, or disposed upon the fender as if it was meant that they should be toasted. Again, in lamps, candelabra, chandeliers, and such-like, the greatest atrocities in taste are committed; all reliance upon the materials employed and the purpose they are intended to serve seems to be thrown overboard, and the study of the makers has evidently been to render their products as little as possible like what they were intended for. Some seize upon the idea of trees with curiously entangled branches, and which have neither art nor nature to recommend them; others get a human figure patiently to support upon its head a weight of metal which would sink the stalwart frame of an Atlas; then animals and birds of all kinds are represented doing physical impossibilities in the cause of light, and, to crown the absurdities perpetrated, Cupids and the other adjuncts of heathen mythology are lavishly interspersed among chandeliers and brackets with a disregard of simplicity and elegance in design which is truly surprising. But we may lay claim to artistic excellence in our machinery; for there, in the forms and the arrangements, strict attention to the proprieties and requirements of each machine may be readily traced. The only beauty attempted is that which the stringent application of mechanical science to the material world can supply, and in the truthfulness, perseverance, and severity with which that idea is carried out, there is developed a style of art at once national and grand. We may quote, as remarkable illustrations of this, Whitworth's tools and the cotton machinery of Hibbert and Platt. We do not for a moment contend that the unbending precision which produces such great results in the cases quoted would be equally applicable to the manufactured products made available for our every-day and domestic wants and comforts, but unquestionably it shews that there are limits to the decorative art prescribed by the uses and the material of the objects on which it is exercised, and that we cannot with impunity attempt to recall defunct or foreign styles of ornament.

ENAMELS.

There are six great varieties of enamels, which may be thus distinguished:—1. The *cloisonnés*, enamels of Eastern origin; 2. The *champlevés*, known as existing in the third century in Gaul; 3. The translucid enamels in relief, which we owe to the Italians; 4. The painted enamels, an invention of the Limoges artists; 5. The miniature enamel, a French invention of the seventeenth century; 6. Jewellers' enamel, of almost universal application.

Grammar of Chymistry.

FOR THE USE OF ARTISTS AND ARTISANS.

By FRANCIS BENJAMIN THOMPSON.

CHAPTER V. (*continued*).—INORGANIC ELEMENTS AND THEIR COMBINATIONS.

Phosphorus (symbol P, equivalent 31·414, sp. gr. 1·770 to 2·089). The term "phosphorescent" is generally considered to apply to all substances emitting light either spontaneously or by friction; although, with regard to the latter, "electric" would be in many cases the more appropriate term. However, we have to consider only the simple substance known as phosphorus, which is familiar in aspect and use to most persons. It is a semi-transparent yellowish solid, smelling like garlic, and igniting on contact with oxygen;—for this latter reason, it is kept under water in hermetically closed vessels.

Since the period of its discovery, phosphorus has been prepared from a variety of substances; but the most usual are bones burned until they become white in an open fire. These are then crushed, mixed with three-fourths of their weight of diluted sulphuric acid, and gently heated for several days. "The bones contain phosphoric acid and lime; the sulphuric acid unites with the greater part of the lime, and a solution of superphosphate of lime is separated by filtration; on evaporating it to dryness, mixing it with charcoal, and heating the mixture in a coated earthen retort, the charcoal takes away the oxygen from the phosphoric acid, forming carbonic oxide, which is disengaged; the phosphorus is converted into vapour, and condenses in water, into which it is led from the beak of the retort. It is purified by melting, pressing through chamois leather under water, or by distillation."*

Nitrogen gas possesses the property of dissolving a small proportion of phosphorus, and this has led to the discovery that by heating common phosphorus for a long time in an atmosphere of nitrogen gas, it is divested of poisonous properties: it is also freed from smell, and is unchangeable in atmospheric air. Its colour is red. This phosphorus, known as "allotropic phosphorus," is used for making the French and German inodorous matches. It does not produce caries in the jaw bones of the operators.

Canton's artificial phosphorus is prepared by calcining oyster shells, and pulverising and sifting the purest part of the calx. Three parts of this are to be mixed with one part of the flowers of sulphur, the whole well rammed into a crucible, and kept at a red heat for an hour. When cold, the phosphorus will be in the form of a white powder.

Phosphorus forms several compounds with oxygen, namely, oxide of phosphorus, hypophosphorous acid (P^2O), phosphorous acid (P^2O^3), and phosphoric acid.

Phosphoric acid (symbol P^2O^5, sp. gr. 2·000). This acid is prepared from bones calcined to whiteness, 3lbs.; sulphuric acid, 2lbs.;—these are to be diluted with three times their weight of water. Mix, and digest with heat for two or three days, adding water to supply the loss by evaporation; then add a larger quantity of water. Mix well and strain; wash the residual matter with hot water, mix the liquors, add ammonia in slight excess, filter, evaporate, and ignite the dry mass in a platinum crucible. 100lbs. of phosphorus when burned, form 227lbs. of phosphoric acid.

Phosphoreted hydrogen (symbol HP, equivalent 33). This is a very inflammable gas. Its combustion is the cause of the well known Jack-o'-Lanthorn. It is commonly associated with sulphureted and carbureted hydrogen.

Phosphorus combines very readily with sulphur in any proportion when heated. According to Dr. Thomson, a portion of phosphorus combined with one portion of sulphur, composes a phosphoret which remains liquid at the temperature of 10° and is ignited at that of 50 and 77° F.

(To be continued.)

* Dr. Reid.

Painting on Glass.

Several correspondents have urgently requested information on this subject; and in complying with their wishes, we would desire it to be fairly understood that we have no intention of aiding the substitution of *glass painting* for *glass staining*, as we are sorry to see is done daily from motives of parsimony, and, indeed, deliberate fraud; for can that be less than fraud where a manufacturer uses pigments instead of oxides—which is the case with many an apparently fine window, which the rain and wind of a dozen years will wash and bleach to its pristine transparent whiteness?

There are two sorts of painting on glass—in oil and water colours. In both processes, the design is first drawn upon paper, then the glass laid flat upon that, and a tracing made with an extremely fine camel hair pencil, dipped in moderately fluid Indian ink. The fainter the outline is, consonant with distinctness, the better, as when the painting is completed it will have to be removed.

When the outline is completed, the colouring may be commenced. Only transparent colours are used, with the exception of opaque black, employed for stopping out lights. The great object in laying on the colours, is to do so evenly—the least discrepancy in this respect being but too painfully visible on the transparent medium.

After painting, the glass should be placed near a fire to dry, and finally coated with mastic varnish. What are termed "lights" are produced by a lancet edge or needle point, by which the colour is scraped from clouds, water, &c., to represent gleams of sunshine, the sparkle of ripples, &c.

The finished painting is preserved by being covered with another sheet of glass, and the edges of both are secured by cement and paper.

Painting on glass in water colours differs in no respect from the foregoing process, excepting that each successive layer of colour requires a thin coating of varnish. This is applied in order to prevent the colours "running" on the addition of fresh moisture, and to obviate the chance of breaking up even tints.

Pigments for glass painting are specially prepared by Messrs. Rowney and Co., as also a prepared chalk for tracing on glass, the marks of which are more easily removable than those of Indian ink.

Foils.

By Benvenuto Cellini.

It is to be understood, then, that four are the sorts of foils; the first is called common foil, the second red, the third blue, and the fourth green. The first, as we say, is termed common foil, which retains the yellow colour which answers for many kinds of jewels and transparent stones. But before coming to shew the mode of making these, it is necessary to know what is the weight of the carat which we have to use in making said foils.

The carat, then, is the weight of four grains of corn; and to make the common foil, must first be taken—

Of fine gold . . .	9 carats.
Of fine silver . . .	18 „
Of fine copper . .	72 „

To make the red foil, take—

Of fine gold . . .	20 carats.
Of fine silver . . .	16 „
Of fine copper . .	18 „

To make the blue foil, take—

Of fine gold . . .	9 carats.
Of fine silver . . .	2 „
Of fine copper . .	16 „

To make the green foil, take—

Of fine gold . . .	1 carat.
Of fine silver . . .	6 „
Of fine copper . .	10 „

This method must then be observed in producing the foils:—Let the copper be first thoroughly fused, and the other two components added to it; and, when all is well incorporated, it must be poured into a rather wide vessel, but without making the stream of metal very large. When it is cast and cold, let it be well filed, then beaten lightly with the flat of the hammer, and frequently re-melted; nor let it ever be extinguished in water, but left to cool of itself, without being ever blown upon. Then, being brought out as thin as the back of a knife doubled, let it be scraped with a sharp rounded razor till you find that, in every part, it is quite polished; and let it be cleaned with a file on the sides, until it appear pure and polished without cracks. Then, when it is beaten out with the hammer, let both of them be flat and clean, and, by the above process, let it be produced as thin as it possibly can be. Care must be taken also to make the said stream of metal square where it issues from the pipe, and according as the quantity of the fusion may allow, which must be about two fingers in width, and somewhat longer. This said width is that which must remain at the end of the operation, and as in drawing it it suffers some cracking, let care be taken to cut them off as they appear, until the stream be brought to the same size as that at which it was conducted, and these pieces must be whitened with gum, salt, and water, which is the ordinary whitening used for silver. Then let these pieces be washed clean in pure water, and rubbed lightly. After this, they must be scraped upon a large copper pipe, which must be smooth and perfectly clean, and let care be taken to scrape them with a goldsmith's razor well ground, and this must be done with the greatest accuracy, in order that they may not be notched; and each of these pieces is scraped on one side only. When this is done, let the foil be taken up with a white linen cloth, quite clean, and let there be a graver well ground on an oiled stone, and let it then be completely cleaned from all uncture or other impurity. Whilst it is being burnished, one must be in a room where no dust arises, and taking a black crayon, of the kind which sword-makers use for gilding, when it is thoroughly burnished, let the colour be given to it; which colour is given by a fire temperate and clear, holding always the piece of foil to the fire, so that the burnished part shall always be towards the face of the artificer, and the part that is not burnished towards the fire; and so, by little and little, the colour will be seen to come. Observe, that by warming the work a little more or a little less, it will take colour more or less, as may be desired; and it is needful to observe this, because the goldsmith requires to have foil more or less coloured, according to the demands of the jewels.

Fayence Pottery.

The earliest ceramic fabric known in France is that mysterious and unique manufacture of the "Renaissance," the fine fayence of Henry II. The manufacture of this ware, which was once carried to a high degree of perfection, seems to have been suddenly and unaccountably lost, without leaving any record of where or by whom it was produced. By many it is supposed to be of Florentine manufacture, and to have been sent by some of the relations of Catharine de Medicis as a present to Henry II.; but it differs too essentially from Italian Majolica, both in the paste of which it is composed, and in the style in which it is decorated, to warrant such a conjecture. Italy does not possess in its museums a single specimen of this ware, and of the thirty-seven pieces extant, twenty-seven have been traced as coming from Touraine and La Vendée. Many antiquaries, therefore, infer that the manufacture was at Thouars, in Touraine, although the fayence may have been the work of an Italian artist.

But if the place of its manufacture is unknown, the pieces extant clearly attest the period of its fabrication. The salamander, and other insignia of Francis I., are met with on the earlier specimens of this pottery; but upon the majority of pieces, upon those more pure in design and more beautiful in execution than the preceding, we find the arms of Henry II., with his device, the three crescents, or his initial H., interlaced with the two D's of the Duchesse de Valentinois. Indeed, so constantly do her emblems appear on the pieces, that the ware, though usually designated as "Faïence de Henri II.," is sometime styled "Faïence de Diane de Poitiers." Even her widow's colours, black and white, are the two which are employed in some of the finest pieces. They were the fashionable colours of the court, Henry wore no others during his life, and was attired in them in the fatal tournament in which he fell. Her *impresa*, the crescent of Diana, is conspicuous on his palaces, and he even caused it to be engraved upon his coins. From these circumstances we must, therefore, conclude that the manufacture of this ware began at the end of the reign of Francis I., was continued under that of Henry II., and, as we find upon it the emblems of these two princes only, we may naturally infer that it is of French origin.

The paste of which this fayence is composed is equally distinct from Majolica and Palissy ware. The two latter are both soft, whereas this, on the contrary, is hard. It

is a true pipeclay, very fine, and very white, so as not to require, like the Italian fayence, to be concealed by a thick enamel, and the ornaments with which it is enriched are simply covered with a thin, transparent, yellowish varnish.

The style of decoration of this ware is unique. Patterns or arabesques are engraved on the paste, and the indentures filled with coloured pastes, so as to present an uniform smooth surface of the finest inlaying, or resembling, rather, a model of Cellini's silver work, chiselled and worked in niello. Hence it is sometimes styled "Faïence à niellure." These patterns are sometimes disposed in zones of yellow ochre, with borders of dark brown, sometimes of a pink, green, violet, black, or blue, but the dark yellow ochre is the predominant colour.

In addition to these elegant niello-like decorations, this beautiful fayence is enriched with raised ornaments in bold relief, consisting of masks, escutcheons, lizards, frogs, shells, garlands, &c.; in all of these the pink colour predominates. The forms of the pieces are always in the purest style of the "Renaissance," and are so finely modelled and so exquisite in execution, as to be compared with the chiselled and damascened works of the goldsmiths of the sixteenth century. They are usually small and light, and consist mostly of ornamental pieces—cups, ewers, and a vase of peculiar form, to which the French have given the name of "biberon."

Technicologia.

157. *Morocco Leather.*— The preparation of this leather is now principally carried on in Turkey, although the process was originally invented in Morocco. The goat-skins are made into parcels, consisting of 36, divided into six bundles, which are folded in the middle lengthwise, and thrown into a pit full of lime. When taken out, they are rinsed in pure water, drained, and suspended in the shade to dry, till the hair becomes loose. After carefully removing the hair, the skins are returned to the limepit for two or three weeks, when they are again rinsed, and passed repeatedly through a decoction prepared of 30lbs. of dogs' dung, and an equal quantity of water. When the skins are impregnated, they are thrown into a large vessel for 12 hours, after which they are cleaned with pure water, and immersed for 7 or 8 days in a watery decoction of bran. The skins are now wrung and thoroughly washed in clear water, to render them soft and pliable; they are next cured by spreading over them layers of sea-salt, in the proportion of half a pound to each skin, and allowing them to remain in pile until they become supple. Lastly, the skins are immersed in a liquid prepared by boiling 24ozs. of dried figs for each; then dried in the air, and dipped in a solution of alum. The chief colours given to Morocco leather by the Turks are red and yellow. The red colour is prepared by mixing together various articles in the following proportions, which are required for a parcel of 36 skins:—Cochineal, ½lb.; crocus Indicus, 3ozs.; gutta gamba, 1oz.; gum arabic, ½oz.; pulverised white alum, ½oz.; bark of the pomegranate tree, ½oz.; citron juice, 2 drachms; water, 120lbs. The alum is gradually added to the other articles, which are thrown into a copper and boiled for 2 hours. The *skins* are repeatedly immersed in this mixture, and when sufficiently imbued with the colour, they are dried, and again steeped in a vessel containing 3lbs. of hot water (for every two skins), together with 1lb. of sumach, and 1lb of gall nuts, pulverised and sifted. As soon as the skins are completely impregnated with this liquid, they are slightly rubbed over with a sponge dipped in pure water, and suspended, without being folded, on a wooden frame, to drain. They are then rinsed in running water, pressed, and dried in a close room. Afterwards, they are polished with wooden burnishers. Yellow berries (grained Avignon) are substituted for cochineal in the yellow dye. The yellow leather is subjected to the dyeing process last of all. With regard to other coloured Morocco leathers, the Turks are surpassed by ourselves; but for yellow and red, they hold the supremacy.

158. *De Vaux's Milk Paint.*—Take 2 quarts of sweet skimmed milk, 6½ozs. of fresh slaked lime, 4ozs. of nut, caraway, or linseed oil, and 3lbs. of Spanish white. Firstly, introduce the lime into a stone vessel, and add as much milk as will make a mixture resembling thin cream. Next, gradually pour in the oil, and add the remainder of the milk, meantime, gently stirring the ingredients. Crumble in the Spanish white, and well agitate the whole. If white paint be required, oil of caraways is best, being very transparent. In order to obtain a distemper or size colour, this paint may be tinged with levigated charcoal, yellow ochre, &c., for painting with which the most common oils may be used.

159. *Turpentines.*—The *Chian* or *Cyprus* turpentine is derived from the pistachia tree. It is of a thick consistence, resembling that of honey; has a fragrant smell and a bitterish pungent taste.—*Venice* turpentine exudes from the larch tree, has a strong smell, and a hot, disagreeable taste. It is less viscid than any of the other turpentines, and generally of a clear whitish or yellowish colour.—*Strasburgh* turpentine possesses an agreeable aromatic odour, but an uncommonly bitter taste. It is neither so thick as the Cyprus nor so thin as the Venice turpentine, but is clearer and less tenacious than either. It is of a yellowish brown colour. *Common* turpentine is extracted from the spruce fir. It is of a dark brown colour, of the consistence of honey, and has the most disagreeable odour and taste.

160. *Imitation Gilding.*—An amalgam of one part of zinc and twelve of mercury is mixed with hydrochloric acid in which some argal (crude tartar) has been dissolved. In this, copper articles, previously cleansed with nitric acid, are boiled. Copper thus coated, it is said, may be drawn out to the fineness of a hair.

161. *Cold Gilding by Friction.*—Steep a clean fine linen cloth in a saturated solution of gold until it has entirely imbibed the liquid. This rag is to be dried over the fire and then burned to tinder, of which a fine powder is to be made. The article to be gilded must be well burnished; a piece of cork is then to be dipped firstly into a solution of salt in water, and secondly into the black powder, which is rubbed on the surface of the article until the golden lustre is attained.

162. *An Excellent Black.*—It may not be generally known that the soot deposited in bell glasses hung over gas jets, affords the finest of all blacks for use as a pigment. The purer the gas, the finer the quality of the deposit. With it may be prepared a far better Indian ink than even the Chinese can pretend to concoct.

163. *Silver Size.*—This size may be prepared by grinding together black lead and white pipeclay, then adding Genoa soap, and lastly well incorporating the mixture with ordinary size.

INITIAL LETTERS.

CIRCULAR WINDOW

FORMERLY IN THE GABLE OF THE PALACE OF WESTMINSTER, PULLED DOWN 1822

Art and Nature.

NO doubt there are many advantages which accrue to us from a course of study, whereby we acquire art solely by means of art; but it is to prevent originality. When the designer has acquired the power of hand, the correct eye, the taste, and the knowledge of principles, which fit him for producing original designs, the trammels with which this system of education has bound him are sure to shew themselves. When he thinks he looks to art, he thinks of art, not nature. The forms, the foliage, the flowers, that present themselves to his mind, are not the forms, the foliage, and the flowers of nature, but such as he has been accustomed to in his studies—those of art, already subdued to its purposes and conventionalised in a degree to suit its necessities. He reconstructs them—recombines them; he generalises them still more, and loses not only the spirit of their first adoption but their truth. The student in this respect has commenced at the wrong end of art; he overlooks nature, and feels no necessity for the study of her works; he never troubles himself to become acquainted with their curious variety, but, trusting entirely to the conventionalised treatment which he finds ready to his hand in those models of excellence which have been so long set up for him, and which he has so long recognised as his idols, he forgets the true fountain of inspiration.

Even if some little spark of genius should light him to perceive a "more excellent way" it is soon extinguished, unless nature has given him a stout heart and a determined spirit. He perhaps doubts—if he is at all sensitive he will be sure to doubt—his own powers and his own taste, and all things combine against him to persuade him that he is wrong. Those for whom he labours, those also who are his critics, have been educated under the same models, in the same system; their little knowledge is formed in the same oft-used mould, and they reject everything which has not its common mint-mark of excellence. Criticism is safe whilst on the side of authority. When judgment is to be passed on original thoughts it must proceed from true taste and knowledge, in which the many who criticise are deficient. From this cause, men constantly decry novel inventions. Going into the workshop of a great lamp-manufacturer and coppersmith, where I observed beautiful workmanship applied to very commonplace design, I inquired if they paid much for designs. One of the principals of the house who accompanied me replied, that they paid nothing for designs, they considered it a useless expense. "But," said I, "how then do you produce your annual novelties?" "Why, as to that, we dispose the parts differently, sometimes combining the ornament used in one branch of our business with the forms of goods in another, &c. In fact," said he, after shewing me an attempt to form a lamp pillar into the support of a tea-urn, "you can hardly imagine how much novelty is to be obtained by merely turning a thing upside down." I am happy, however, to say that this case is an exception.

A great remedy for the evil, as far at least as it relates to the student, will be found in the study of the natural sources of ornament. He will there learn to see nature for himself, and to adapt the truths which he gathers from her to his own purposes; above all, he will acquaint himself largely with the details of natural objects, and where he finds it necessary hereafter to simplify those details for the purposes of art, he will do it with knowledge and not in ignorance. There can be no falser mode of study than that which begins with generalisation—the attempt to gain the end without first seeking to understand the means. All those who have arrived at excellence have done so by beginning more or less with laboured and careful imitation. Gradually, as they increased in power, they have arrived at greater freedom, until—the master-mind and the master-hand, the two great essentials, working together—they have, with the fulness of knowledge, shewn the perfection of facility. There is a great example of this in the works of Raffaële; dry and imitative, treading in the steps of his master Perugino, in his first works, less laboured and more earnest in his middle time, he had arrived ere he died (unhappily in the vigour of his manhood) at a perfect ease of manner and hand, which expressed without hesitation or difficulty the thoughts of his full and overflowing mind.

Such a progress to excellence is as requisite to the ornamentist as to the artist; nay, perhaps, more so, since much of the beauty of his work depends upon mere skill of execution. If, therefore, he is led away to rest all his claims upon this quality at the beginning of his course, he will be sure to fall into an insipid facility, and be far less likely to endeavour to attain that ruling motive, that mental association, without which neither ornament nor art can ever be excellent. In all preparatory studies the pupil should, by a careful and even laboured imitation, master thoroughly all the details of nature, and acquaint himself with the anatomy of her structure. For this purpose drawing is, in the first place, of great importance, since the use of the point imparts a decision and gives a degree of clearness in the delineation which colouring may, and often does, interfere with. The perspective of the curves of the stems and leaves, and the extended peculiarities of growth, are given in a drawing with infinitely less labour than in a coloured study. To this end it is right to commence the studies with outline drawings, first from copies and then from the plants themselves; a course equally useful to the modeller of ornament as to him whose future labours will require a further introduction into colour. When the student has become thoroughly acquainted with the forms of plants by careful outline drawings made from nature (in which due attention has been paid to the alterations that take place according to the different points from which the parts present themselves to the eye, producing thereby that perspective treatment which is termed foreshortening), he will next proceed to study the different modes in which colour is applied to form, first from paintings and afterwards from the plants themselves, in water-colours, tempera, and oil-colours. Of these, the two latter are, perhaps, the most desirable means, both from the much greater facility with which they are used when once acquired, and also that they are both likely to be extensively available in his future labours. Tempera painting, either with an egg or size medium, is largely used in decorative design, as well as in designing for hangings and various woven fabrics, and is a valuable means in the hand of the ornamentist. Oil-painting is also much used decoratively, and, with an essential oil as a vehicle, is the means of painting on pottery, glass, &c. But, in whatever vehicle the studies are wrought, let

them be earnest and truthful imitations of the copy or the plant: simply endeavour in this stage faithfully to transcribe nature, until at length, when the pupil has become thoroughly possessed of this power, he will be taught how to use it in subjecting plants and flowers to a decorative or ornamental treatment, by a systematic combination and arrangement.

Difficulties, no doubt, arise, but perseverance will overcome them. Among these difficulties, one arises from the culture of the plants, whereby they have in a degree been made subject to another art, that of the horticulturist, which has already suited them to its own purposes by regularity of display. Another difficulty arises from the occasional necessity of studying by an artificial light, which obscures entirely some of the more delicate tints, as yellows and greens, and changes the relation of all. The only cure for this latter evil, viz., the difficulty of seeing colour by an artificial light, is to be found in a careful mixture of tints, with a constant use throughout any given study of the same pigments in their composition. By these means some of the disadvantages may be avoided, and, whilst certain power and execution are obtained, it is to be hoped the pupil will not be allowed to go astray from truth. Thus, then, with such extended studies, such careful imitation, and diligence in their completion, the student will be enabled to cast off all reliance on the facility of ignorance — that delusive facility which so often captivates the beginner—and he will arrive eventually at freedom by the only true way, the road of knowledge.—*Redgrave's Lecture on Botany.*

KERMES OAK.

This kind of oak (*quercus coccifera*) grows plentifully in Spain, Provence, Languedoc, and along the Mediterranean coast. It is a tree of small growth, seldom rising above twelve feet. The leaves are oval and undivided. They are smooth on their surface, but indented on their edges, which are armed with prickles like those of the holly. It is feathered to the bottom, which gives it the appearance of a bushy shrub. The acorns are smaller than those of the common oak. From this tree are gathered the kermes, with which the ancients used to dye their garments of that beautiful colour called coccineus or cocceius—being different from the *purpura* of the Phœnicians, obtained from the testaceous fish called murex. In course of time, the murex was neglected, and the kermes we are speaking of was introduced. This supported its reputation till the discovery of America, when it gave place to the cochineal, an insect found in the American woods, upon a plant named by Linnæus *cactus cochinillifer*. The kermes are insects which live on the bark of the *quercus coccifera*. The females grow big and at length remain motionless, when they are nearly the size and shape of a pea, and of a reddish brown colour. On account of their figure, they were for a long time mistaken for the seeds of the tree itself—whence they were called "grains of kermes." They also bore the name of vermilion. If the living insect be bruised, it gives out a red colour. Its smell is somewhat pleasant, its taste a little bitter, rough, and pungent. When dry, it imparts this smell and taste to water and alcohol, to both of which it gives a deep red colour. This colour is retained by the extracts made from these infusions.

GLASS PAINTING.

Theophilus, whose treatise upon the arts, written at the commencement of the 11th century at latest, and whose work forms the link between ancient and mediæval art, gives the earliest known directions for the production of painted glass windows. It is worthy of remark, that the window glass of this period is an alkaline silicate only, composed of two parts of beech-wood ashes and one of pure white sand, and is extremely hard and infusible. The process of forming the plate of glass is exactly that followed in most parts of France at the present day, and which affords a thicker and more uniform plate than our crown-glass. The earliest ornamented windows were probably of a mosaic pattern, formed with stained glass; but Theophilus describes the shadow colour proper for painting and drawing upon stained glass. He speaks also of a clear white glass, or flux, which melts as soon as it experiences the heat of the fire; this is to be used with glass of various colours, imitating gems. The tints used in painting are of white, black, green, yellow, blue, and purple glass; and Theophilus describes them as square, opaque, and as being found in the temples of the pagans. These are, doubtless, of the *vitrum Romanum* of Eraclius, and are those mentioned by Pliny, lib. xxxvi., c. 26. They were collected and used by the French likewise. The green glass of the ancients was generally a silicate of copper, sometimes allied with arsenic and borax (Egyptian alum), or lead; sometimes bronze-filings were used (copper and zinc), lead being added. Blue glass was coloured with ultramarine, or with cobalt, mixed with a flux; or copper-filings were used mixed with an excess of salt (soda or potash), little heat being employed. Malachite powder was used for a jacinthe; arsenic, for a chrysolite; manganese, for a violet, modified by ultramarine or cobalt: oxide of copper and black oxide of iron, either together or separately, formed the red, united with matter yielding carbon; antimony was used for yellow.

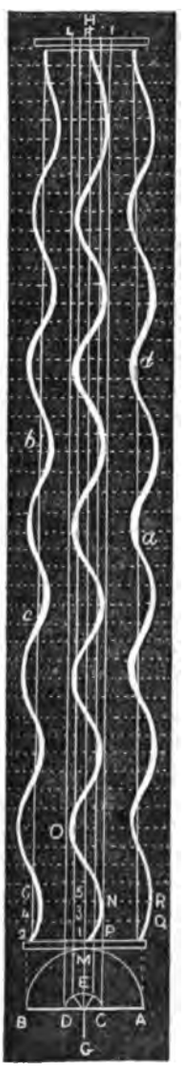
VENETIAN GLASS.

It is to the participation of Venice in the taking of Constantinople by the Italians, A.D. 1204, that she owes in all probability the introduction of her manufacture of ornamental glass, which may have received a fresh impetus from the immigration of Greek artists into Italy in 1453, on the downfall of the empire of the East. Not long subsequently to the latter period Venice became celebrated for glass bowls, salvers, and bottles, painted with arms and devices in enamel; also for glasses of a jasper-like appearance, afterwards known as *schmelze;* and vessels with threads of colour exteriorly posed. These were the immediate results of the lessons of Byzantium; but the Venetians were not content to remain the mere copyists of their contemporaries. They therefore soon began to revive processes which had been neglected since the Roman times, and which consisted of imbedding glass mosaics in crystal, previously prepared, and of enclosing coloured glass reeds and threads in crystal. The next step of the Venetians was invention. We find original processes in their frosted crystal of the 16th century, and in their embossed crystal, the subjects upon which were blown hollow from within, and also in their insertion into crystal of exquisitely minute particles of gold, strewn together in regular patterns. This application of gold to glass differed entirely from that practised by the classical ancients, and was evidently unknown to Eraclius and Theophilus.

Wreathed Columns.

These kind of columns, which are pretty well known by their names, and are usually made very rich, ought never to be used but in places of distinction, as in altars, tombs, saloons, and other places where magnificence is required.

They should never be used to support either walls or vaults, or any other considerable burthen, by reason of their weakness; nor should anything be laid upon them



beyond a plain slight and delicate entablature. For though they appear by their circumvolutions to have less delicacy than the common columns, yet in effect they have less solidity. This is evident from the perpendiculars *ab*, *cd*, drawn by the cavities of their waves; the solid space included between the two, being considerably less in diameter than the column G H, which however is as delicate as possible.

Divide the diameter of the plan of the column into three equal parts, A C, C D, D B.

On the division C D, as on a diameter, describe a semicircle C E D, and divide it into three equal parts.

From the divisions of this little semicircle draw lines parallel to the axis of the column E F.

Draw a common column as G H, of the same height, and in the same order as the wreathed column to be designed.

Divide its axis, G H, into 48 equal parts, which is easily done by dividing it at first into three, then each of these into two, and each of these into two more: thus proceeding from two to two till you get the whole number 48.

Through these divisions draw lines parallel and horizontal.

From the points where these parallels cut the perpendiculars C I, D L, &c., describe the spiral M, N, O, &c.,

Through the points of that spiral draw transverse lines P Q, N R, &c., equal to the transverse lines 1, 2, 3, 4, 5, 6, &c., and you will have points sufficient for describing your wreathed column.

The wreathed columns in the high altar of St. Peter's at Rome, have two astragals, which divide the height of the shaft into three parts, but these are not to be imitated excepting where there are particular reasons for it.

Those in the altar of the Val de Grace have an astragal over the first third of their height, which is a judicious contrivance to hide the juncture or setting on of the two pieces, whereof each column consists.

But what is thought inexcusable both in the wreathed columns of St. Peter, and in those of the Val de Grace, are the flutings in the first third of their height, for these render the lower part of the column more delicate than the upper part; which is the more visible, by reason of the foliages and other ornaments that run along the upper parts, and by their relievo seem to increase its bigness; for this reason it had been better to have fluted the upper part, and either to have charged the lower part with foliages, or to have left it quite plain and uniform.

Another thing to be censured in the altar of the Val de Grace, is the entablature, which is distributed piecemeal over each column; a continued entablature would doubtless have done much better.

ANOTHER CURIOSITY OF GILDING.

In our first volume (p. 104), under the heading "Curious Gilding Process," we gave an account of a method of gilding live fish: gilding the human intestines will, we imagine, be deemed a more remarkable accomplishment. On the authority of the *New Quarterly Review*, we learn that poisoning himself with gold leaf is not an unusual mode by which a mandarin "in difficulties" terminates his weary life. He makes an ounce of gold leaf into a ball and swallows the pill, which, slowly unrolling in the stomach, spreads uniformly over the internal coats, as if laid on by an artist's hand. The organ thus gilded ceases to perform its functions, and the mandarin expires gradually without pain.

CORRESPONDENCE.—*Glaziers' Diamonds.*—Query.—"I beg you will excuse me for writing again with regard to the diamonds. I think you misunderstood my meaning as to the setting of the diamond. What I wanted to know was how to set it in the brass and then in the socket. I am well acquainted with the make of it; for it is my daily work to use it. I wish to know what degree of heat it will stand, and whether the metal is run round the spark by the blowpipe, or melted in a crucible, and then cast on it in a mould. When the spark drops out, I am obliged to send it to London or Birmingham, which is very expensive, besides a great loss of time before I can have it again. I am, Sir, &c., P. K. (Northampton)." [Can any of our readers answer the above? If so, we shall be happy to insert the information.]—*Working the Ionic Volute.*—J. H. H. (Northampton).—The diagram is perfectly correct. The engraver has re-traced it, and we have done so ourselves since receiving your letter.

Technicologia.

164. *Tests for Gold.*—Where the portion of metal is too insignificant for an assay, its fineness or quality may be ascertained by the touch, which is a method of comparing the colour of the metal under examination with that of certain gold bars whose composition is known. These bars are called touch-needles, and they are rubbed upon the black basalt, which for that reason is called the touchstone. Black flint or pottery will serve the same purpose. Sets of golden needles may consist of pure gold, pure gold 23½ carats with half a carat silver, 23 carats gold with one carat silver, 22½ carats gold with 1½ carat silver, and so on, until the silver amounts to 4 carats, after which the additions may proceed by whole carats. Other needles may be made in the same manner with copper instead of silver; and other sets may have the addition, consisting either of equal parts of silver and copper, or such proportions as the occasions of business require. These needles afford a degree of information more considerable than might at first be expected. The attentive assayer not only compares the colour of the stroke made upon the touchstone by the metal under examination with that produced by his needle, but will likewise attend to the sensation of roughness, dryness, smoothness, or greasiness which the texture of the rubbed metal excites when abraded by the stone. When two strokes, perfectly alike in colour, are made upon the stone, he may then wet them with aqua fortis, which will affect them very differently if they be not similar compositions; or the stone itself may be made red hot by the fire, or blowpipe if thin black pottery be used, in which case, the phenomena of oxidation will differ according to the nature and quantity of the alloy.

165. *Imitation Inlaying.*—Suppose I want an oak panel with a design inlaid with walnut. I grain the panel wholly in oil. This is not a bad ground for walnut. When the oak is dry, I grain the whole of the panel walnut in distemper. I have a paper with the design drawn thereon, the back of which I rub with whiting, place it on the panel, and with a pointed stick trace the design. I then with a brush and quick varnish trace the whole of the design. When the varnish is dry, with a sponge and water I remove the distemper, where the varnish has not touched. This, if well executed, presents a most beautiful imitation of inlaid wood. Marbles are executed in a similar manner. This kind of work is done to a very great extent.—W. H. Y.

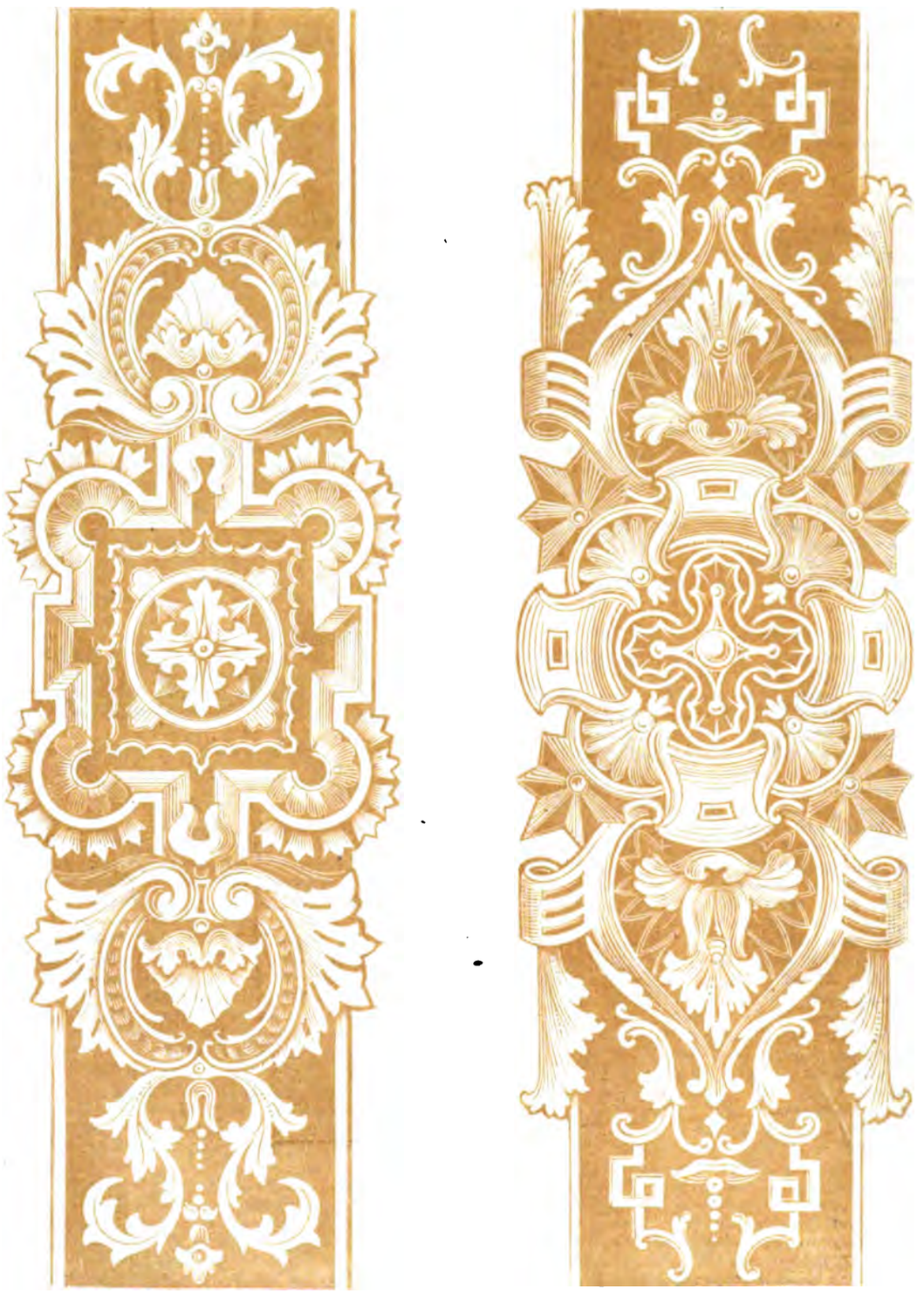
166. *Jackson's Method of Beautifying and Preserving the Colour of Wood.*—Take equal parts of pumice stone and burned alum, lapis calaminaris (zinc ore) and sulphate of iron calcined to redness, of each half a part. Reduce the whole to a fine powder, and rub it on the wood with a woollen cloth until it acquires a fine polish. —The *stain* must now be prepared as follows: boil 6lbs. of stick lac in three gallons of water until the colour is extracted; then strain the liquor. Boil half a pound of madder root in three quarts of water. Next, digest in a glass vessel, containing one gallon of spirit of wine and a solution of 2ozs. of pearlash in half a pint of water, half a pound each of cochineal and kermes, and 4ozs. of clean scarlet cloth cuttings, until the liquid has extracted all the colouring matter of the several ingredients. Add the decoction of lac and madder, and mix with the whole a sufficient quantity of aqua-fortis to impart the desired tinge. This compound is to be laid on the wood with a brush.—For the *varnish*, take of white amber, 1lb.; copal, ½lb.; spirit of turpentine, ½lb.; nut-oil, 6lbs.; a little of the oils of rosemary and lavender may be added. Digest in a sand-heat until the oils acquire a syrupy consistence, then strain the liquid, and when clear, apply in the ordinary manner.

RANSOME'S PROCESS FOR PRESERVING STONE.

The stone or other material is coated or saturated, wholly or superficially, with a solution of soluble silicate, and has afterwards applied to it a solution of chloride of calcium, by which an insoluble silicate of lime is formed in the body of the stone. In place of a soluble silicate and chloride of calcium, other preparations may be used; the invention consisting in the application in succession of two solutions, which, by mutual decomposition, produce an insoluble substance, which is deposited in the structure and on to the surface of the stone or other material. This compound is remarkably tenacious and cohesive. One important feature in Mr. Ransome's process is, that it not only prevents new stone from decaying, but effectually prevents the further decay of that which is already rapidly approaching disintegration. The efficacy of this mineral is not confined to stone alone, but may be applied to brick, lime, stucco, &c., with equally effective results.

PREPARATIONS FOR A TOURNAMENT.

The following is a list of the articles bought for the tournament of Windsor Park in the sixth year of the reign of Edward I.:—Armour was provided for all the knights. It appears to have been of leather gilt; and various sums, from 7s. to 25s., were paid for making and gilding each suit, which consisted of a tunic, a surcoat, a pair of ailettes (epaulettes), a crest, a shield, a helmet of leather, and sword of balon (a sword covered with cloth). Three shillings were paid for the carriage of these suits from London to Windsor. The shields were of wood at 5d. each, and 38 swords made of balon and parchment were furnished at 7d. apiece—25s. extra being paid for silvering the blades, and 3s. 6d. for gilding the pomels and hilts with pure gold. Twelve shillings were paid for gilding with pure gold, 12 helmets for the knights of the highest rank; and for silvering the remainder, 17s. 4d., being at the rate of 8d. each. Thirty-eight head pieces of leather, resembling horses' heads, cost 2s. each, and the same number of pairs of little wings of leather where charged 8d. per pair. Besides these, there were 800 little bells, 16 skins for making bridles, and half a horse's skin for cruppers, likewise 144 silken cords for tying on the ailettes, and 76 calf skins for making crests. The sum expended in England was £80 11s. 8d. The articles procured from Paris consisted chiefly of furs of various kinds for the use of the royal family, the king's couch, the queen's mantle, &c., amounting in the whole to £608 18s. 6d. of Paris. Canvas, fine linen towels, &c., amounted to £130 18s. 6d. Saddles richly embroidered with gold and silver, eight of them with the arms of England, and others with those of the knights, and two for the king's mule, cost £280 14s. 2d. The sum total of the expenses at Paris was £1,428 5s. 0d. of Paris, being £447 12s. 5d. English sterling.



BORDURES GERMANESQUES

INITIAL LETTERS

Style and Manner.

THE simple imitation of subjects of easy comprehension (we will take fruits and flowers as an example), may be carried to a high point of perfection. It is natural that he who paints roses should soon learn to distinguish and select the most beautiful, and seek for such only, among the thousands that summer affords. Thus we have arrived at selection, although the artist may have formed no general idea of the beauty of roses. He has to do with comprehensible forms; everything depends upon varied arrangement and superficial colour. The downy peach, the finely dusted plum, the smooth apple, the burnished cherry, the dazzling rose, the manifold pink, the variegated tulip, all these he can have at will in his quiet studio, in the perfection of their bloom and ripeness; can put them in a favourable light; his eye would become accustomed to the harmonious play of glittering colours; each year would give him a fresh opportunity of renewing the same models, and he would be enabled, without laborious abstraction, to know and seize the peculiarities of the simple existence of these subjects. In this way were produced the masterpieces of a Huysum and Rachel Ruysch, artists who seem almost to have accomplished the impossible. It is evident that an artist of this sort must become greater and more distinguished, if, in addition to his talent, he is also acquainted with botany; if he knows, from the root up, the influences of the several parts upon the expansion and growth of the plant, their office and reciprocal action; if he understands and reflects upon the successive development of leaves, fruit, flowers, and the new germ. By this means he will not only exhibit his taste in the selection of superficial appearance, but will at once win admiration, and give instruction through a correct representation of properties. In this wise it might be said that he had formed a style; while, on the other hand, it is easy to see how such a master, if he proceeded with less thoroughness, if he endeavoured to give only the striking and dazzling, would soon pass into mannerism.

Simple imitation also labours in the antechamber that leads to style. In proportion to the truth, care, and purity with which it goes to work, the composure with which it examines and feels, the calmness with which it proceeds to imitate, the degree of reflection it uses, that is to say, with which it learns to compare the like and separate the unlike, and to arrange separate objects under one general idea, will be its title to step upon the threshold of the sanctuary itself.

If now we consider manner more carefully, we shall see that it may be, in the highest sense and purest signification of the word, the middle ground between simple imitation of nature and style.

The nearer it approaches, with its more facile treatment, to true imitation, and, on the other side, the more earnestly it endeavours to seize and comprehensibly express the character of objects, the more it strives, by means of a pure, lively, and active individuality, to combine the two, the higher, the greater, and more noble it will become. But if such an artist cease to hold fast by and reflect upon Nature, he will soon lose sight of the true principles of art, and his manner will become more and more empty and insignificant in proportion as he leaves behind simple imitation and style.

We need not here repeat that we use the word manner in a high and respectable sense, so that artists, who, according to our definition, would fall under the denomination of mannerists, have nothing to accuse us of. It is only incumbent upon us to preserve the word style in the highest honour, in order to have an expression for the highest point art has ever attained, or ever can attain. To be aware of this point is in itself a great good fortune, and to enter upon its consideration in comparing with sensible people, a noble pleasure, for which we hope to have many opportunities.

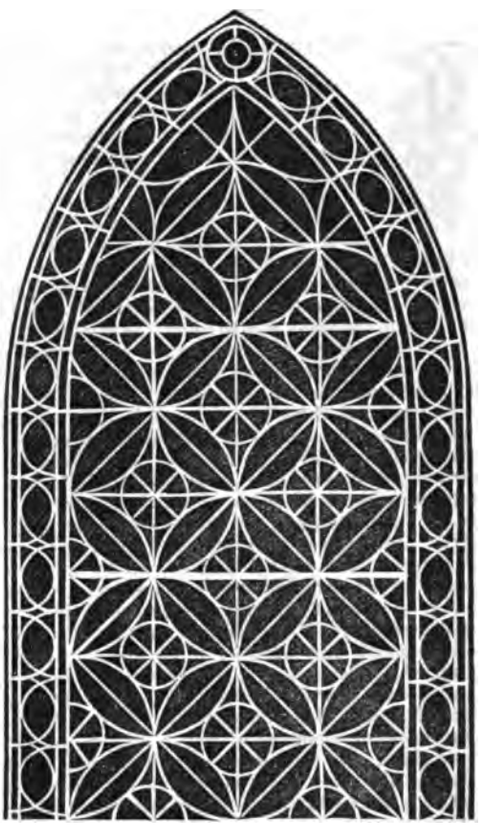
Tingeing Diamonds.

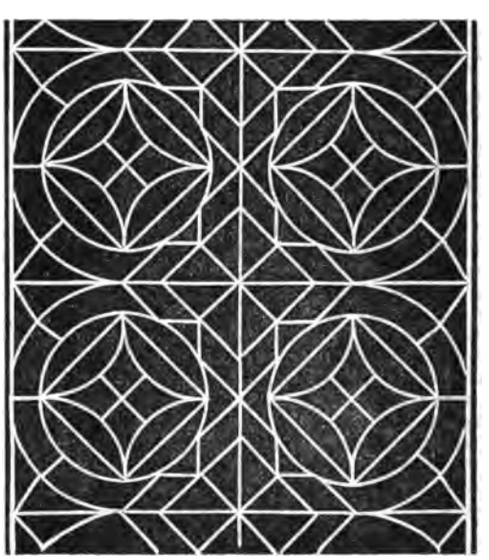
BY BENVENUTO CELLINI.

A lamp is taken clear and lit with a wick of the whitest cotton; and the oil by which it burns must be old, sweet, and clear; and this lamp must be placed on the ground or elsewhere, as may be most convenient, between two bricks. On these bricks is then placed a saucer of the cleanest copper, which is placed at the concave side over the lamp, so as to refract the third part of the light, and no more. But heed must be taken to make little smoke at a time; for it is to be observed that, as too much of such smoke accumulates, the fire mingles with it, and so the smoke spoils. Wherefore, according as the lamp makes smoke, this must be brushed off from the saucer with a little clean paper, and placed in some perfectly pure receptacle; and you are to know that the fire never touches this smoke if it is not in volume more than the backs of two thick knives, so that, by this instance, you may infer that the smoke may be allowed to accumulate in the saucer as much as the back of a knife. You must next have some mastic, a gum familiar to all druggists; but be careful that this mastic be not too new, which is to be known by its being whitish and soft. Furthermore, be careful that it be not too old, whereof you have notification when it becomes too yellow, being dry and of little substance. So the practised goldsmith must take it seasoned, neither fresh nor dry, and, in selecting it, take that which is polished and rounded, because, when it falls from the tree, it is, for the most part, gathered earthy and soiled with other matter. When the mastic has been chosen fine and pure, let a small brazier be taken full of lighted coals: then have a small iron made like a bodkin, and let the point of that iron be heated so as that it may be stuck into one of those balls of mastic, care being taken not to pass the centre of the ball; then let it be held over that fire, turning it gently till it shall be seen beginning to run; and, as soon as this is seen, the fingers must be moistened with a little saliva, and that ball, now hot, quickly pressed before it cools; for, in pressing it, there exudes a drop most clear, which, immediately running down that mass which remains of the mastic, must be cut off with the scissors, and kept clean. And so go on doing till you have that you need of it. After this, the grain-oil necessary for the colouring is made, which is obtained in this manner. Let the pure grain be extracted from all the other seed, with the proviso that this grain must be clean, not eaten by caterpillars, nor heated; and then let as much be taken at a time as

may be shut in the hand. It is then placed on a piece of porphyry; or a person who has not porphyry may use a copper plate perfectly clean, placing the grain spread out upon it, with another plate of iron of a finger's thickness, and five in diameter; which plate must first be placed on the fire, and heated to the point when it will begin to burn a sheet of paper, but no more. It must next be well weighed down by a heavy hammer, till the oil is seen to exude from the grain. But extreme care must be taken that the iron be not too hot nor too cold; since, were it cold, the oil would not exude, and were it too hot the latter would take fire again and be useless; but if it be moderately heated, and the plate well weighted, the said oil will exude excellently. When this is done, those grains must be removed with the greatest diligence; and when they are removed, take a clean knife, and with it skim the oil, observing that the first distillation from the grain is a little watery, which is easily perceptible, as it escapes of itself, and the true and good oil remains in the midst. The said oil must be placed in a small glass as clean as possible. After this, a little sweet oil of almonds must be provided, although, in the stead of this, some have on occasion used olive-oil two years old and no more, perfectly sweet and clear. When this is done, take a spoon four times as large as ordinary spoons, and have prepared at the same time a brazier with fire; and, taking those drops of mastic, put them in the spoon, and, with a small silver or copper shovel, quite clean, begin to melt the mastic at a moderate fire, and, as it is seen to melt, add to it a little of that grain-oil, to the amount of a sixth part of the mastic. And, having mixed together these two liquids, add the third liquid, to wit the olive or almond-oil, as we have said, leaving it optional which to take; besides these matters, let a portion of most clear turpentine be added. Having so made the said infusions, take that smoke which was first made, and add of it, with discretion, such quantity as shall just tinge and no more; for, in colouring diamonds, the diverse quality thereof requires a tinge more or less black. Furthermore, the undue tenderness or hardness of the said tinge is of great importance, because diamonds of some kinds look better having a hard tinge, and others harmonise with the tender tinge. Wherefore, every time that the goldsmith has to set a diamond of importance, it is necessary to renew the tinges, then to try them on the diamond, the more hard and the more soft, the more and the less black, and, according as the quality of the diamond requires, to select, with refined judgment, the tinge with which it accords most. Some there have been who, having a diamond of too yellow a colour, have, on this account, put as little smoke as possible in their tingeing, mixing with the tinge indigo, which is a blue colour known to all painters; and they have sometimes substituted this indigo for black smoke without any admixture of smoke; and this they have used to colour diamonds of a certain kind, in colour so yellow that they look like clear topazes. Whence it has been seen by experiment that, with this colour of dark blue, the stones have shewn admirably; and this happens because, in taking two colours, that is, blue and yellow, and mixing them together, they result in a green colour; so that, the diamond being yellow-tinted and the colouring blue, a very pleasing and beautiful water is produced in the gem. And, although this water is coloured, not therefore does it become yellow or blue as it was in the original tinge, but appears of a changing colour very fair to the eyes of the beholders.

Glaziers' Draughts.





Colour.

The law of contrast of colours is based on the physiological fact that the eye is constructed for seeing *white* light. It is well known that a ray of white light is decomposed by a prism into an infinite number of variously coloured rays, which are divided into six groups—viz., red, blue, yellow, violet, orange, and green. The first three are termed *primaries*, as all the other colours are derived from them. The remaining three are formed by the mixture, in pairs, of the primaries; these are called *secondaries*. Thus, *violet* is formed of red and blue, *orange* of red and yellow, *green* of yellow and blue. In order to recompose white light, we mix a primary with a secondary composed of the other two primaries, as red with green (blue and yellow), blue with orange (red and yellow), yellow with violet (red and blue). If we mix two primaries together, we only obtain a secondary; but in mixing a primary with a secondary all the constituents of white light are united. The colour required to make up, with a given colour, the full complement of coloured rays composing white light is the *complementary* of that colour. The complementary of a primary is always that secondary which is composed of the other two primaries, and *vice versâ*. Such is the theoretical result!

Now, when a given colour is looked at steadily for a few seconds—suppose it to be red—the eye immediately desires to see white light, and of itself supplies those rays necessary to constitute it; it therefore calls up the complementary of red, which is green, and so with every other colour. This phenomenon is termed "successive contrast," and affects our view of coloured bodies in a remarkable degree. All the phenomena of contrast of colours depend upon this tendency of the eye to see white light, and one remarkable result is that we can never view pure primary colours for any length of time without their passing into secondaries.

We are now prepared to understand M. Chevreul's *law of simultaneous contrast*, which may be expressed in the following terms:—

Every colour when placed beside another colour is changed, and appears different from what it really is, and moreover equally modifies the colour with which it is in proximity.

Having recognised this great truth, we have next to consider the nature of this modification, and its influence upon our judgment of the colours of objects.

Place two coloured stripes beside each other—say red and blue. The eye demands the complementary rays necessary to compose white light. The sight of red calls up its complementary—green, which is added to the blue, making it appear greenish, while orange, the complementary of blue, is added to the red, making it appear yellower, or, what amounts to the same thing, the deficient primary, yellow, is called up by the eye, and added to the other primaries.

This experiment exhibits the three different kinds of contrast—1. The *simultaneous*, which includes contrast of colour and contrast of tone. 2. The *successive*, the colour that succeeds to that viewed, or its complementary. 3. The *mixed*, consisting of this complementary added to the other colour viewed. Thus we have seen how, the sight of red calling up its complementary, green, this latter, added to blue, illustrates the phenomenon of mixed contrast.

If the colours placed beside each other are mutually complementary, contrast strengthens, and causes them to appear more different than they really are. Take red and green. Green, the complementary of red, added to green, increases its intensity. Red, the complementary of green, added to red, augments its intensity.

Contrast of tone (or intensity) gives rise to some very curious phenomena. If we place two pieces of the same red together, but one a light shade (or tone), and the other a deeper shade, setting out from the line of contact, the light tone will appear lighter, and the deep tone deeper, this effect gradually diminishing as the colours recede from the line of contact. Thus, in viewing two contiguous coloured objects, differing in intensity of colour, we have not only the contrasts of colour explained above, but also contrast of tone, both of which, combined, tend to increase the apparent difference between the coloured objects.

For want of knowing the law of contrast, calico-printers are constantly exposed to error in judging the value of recipes for colouring compositions, or rather in mistaking the true tint of the designs they have themselves applied upon grounds of a different colour:—"At a calico-printer's," says M. Chevreul, "they possessed a recipe for printing green, which, up to a certain period, had always succeeded, when they fancied it began to give bad results. They were lost in conjecture upon the cause, when a person who had attended my lectures on contrast at the Gobelins recognised that the green of which they complained, being printed on a ground of blue, tended to become yellow through the influence of orange, the complementary of the ground. Consequently he advised that the proportion of blue in the colouring composition should be increased, in order to correct the effect of contrast. The recipe modified on this suggestion gave the beautiful green before obtained."

This example demonstrates that it is much easier for a painter to correct an effect of contrast than it is for a calico-printer, supposing both to be ignorant of the law of contrast; for if the first perceives in painting a green pattern on a blue drapery that the green comes too yellow, it is sufficient for him to add a little blue to the green, in order to correct the defect that strikes him. It is this great facility in correcting the ill effect of certain contrasts which explains why painters so often succeed in obtaining their end without being able to account for it.

A few years ago her Majesty's Theatre, in the Haymarket, was redecorated, and the colour chosen for the linings of the boxes was amber-yellow. Now, the selection of this particular colour gave rise to great discussion at the time. One party pointed out its unsuitableness, inasmuch as it gave a livid hue to the complexion of the audience—in obedience to the law of contrast, violet blue being the complementary colour to yellow. Moreover, being a light or luminous colour, it did not present the redeeming quality of contrast of tone, as a dark green, purple, or violet would have done. Another party dogmatically asserted the suitableness of the colour, basing their argument upon the supposed analogy of this yellow lining to the gilt frames of pictures, forgetting that the practice of framing pictures is often destructive of their proper effect, and always so unless the picture is painted with reference to the influence of the framing. Here was an instance where a knowledge of the law of contrast was indispensable to the critics to enable them to exercise a correct judgment in so important a case.

But, wherever we turn, whenever assorted colours

meet our view, in the majority of cases their arrangement is in direct violation of the true principle. We decorate our houses. The painter and paper-hanger conclude their tasks. Then comes the upholsterer. He, in all probability, acts in direct opposition to the decorator who has preceded him. Very beautiful and excellent are his hangings, but, instead of harmonising with the walls, they exhibit most painful discord. The evil he commits is one of great magnitude, for not only is our money misspent, but our comfort is disturbed. There are æsthetics of coloured objects, and our nervous system is no less susceptible of inharmonious colours than of inharmonious sounds. Jones and his wife always disagree when they chat in that fiery-red papered room. In the light green they are as "happy as the day is long."

Our wives go a-shopping. They ask to look at a red merino. The shopman displays a dozen pieces in succession, all dyed in the same vat, perfectly identical in colour; yet the ladies insist that the last five or six pieces are not of so good a colour as the rest. How is this? The answer is simple. Their eyes no longer see the colours as they really are. The phenomena of successive and mixed contrast are at work, the prolonged sight of red excites the eye to call up its complementary green (the operation of successive contrast), which, being added to the red, tarnishes it, and the longer the eye looks at the red the duller it will inevitably appear. If the shopman is alive to the law of contrast he will place pieces of green before his customer, and by that means restore the eyes to their normal state. The complementary of green, being called up by the eye, is added forthwith to the colour of the red stuffs, which then look better than they really are.

The following extract shows how a paper-stainer was made to appreciate the advantage of a knowledge of the law of contrast:—"In going with him over his factory," says M. Chevreul, "he shewed me a chimneyboard, representing a child, whose figure stood out from a ground formed of two circular bands in gray flat tints, one deeper than the other. The phenomenon of contrast of tone was manifested at the borders, where the two bands met in such a manner that the part of the dark band contiguous to the light band was darker than the rest, while the part of the light band contiguous to the dark band was lighter than the rest. The effect not being what the skilful artist wished to obtain, he inquired of me how it was to be avoided. I replied that the gray of the light band must be deepened with black in proportion as it approached the border of the dark band, while the dark band must be reduced with white in the same manner; and proved to him that, to imitate a model faithfully, we must copy it differently from what we see it."

Technicologia.

167. *Liquid Glue.*—Place a sufficiency of shell-lac (unpowdered) in a tall, wide-mouthed bottle, add methylated spirit until its surface is level with the top of the shell-lac. Sixty hours will perfect the solution, if the bottle is well corked and shaken occasionally; but if the solution is required for immediate use, the bottle must be immersed to the neck in hot water, and its contents stirred until homogeneous.

Japanese Art.

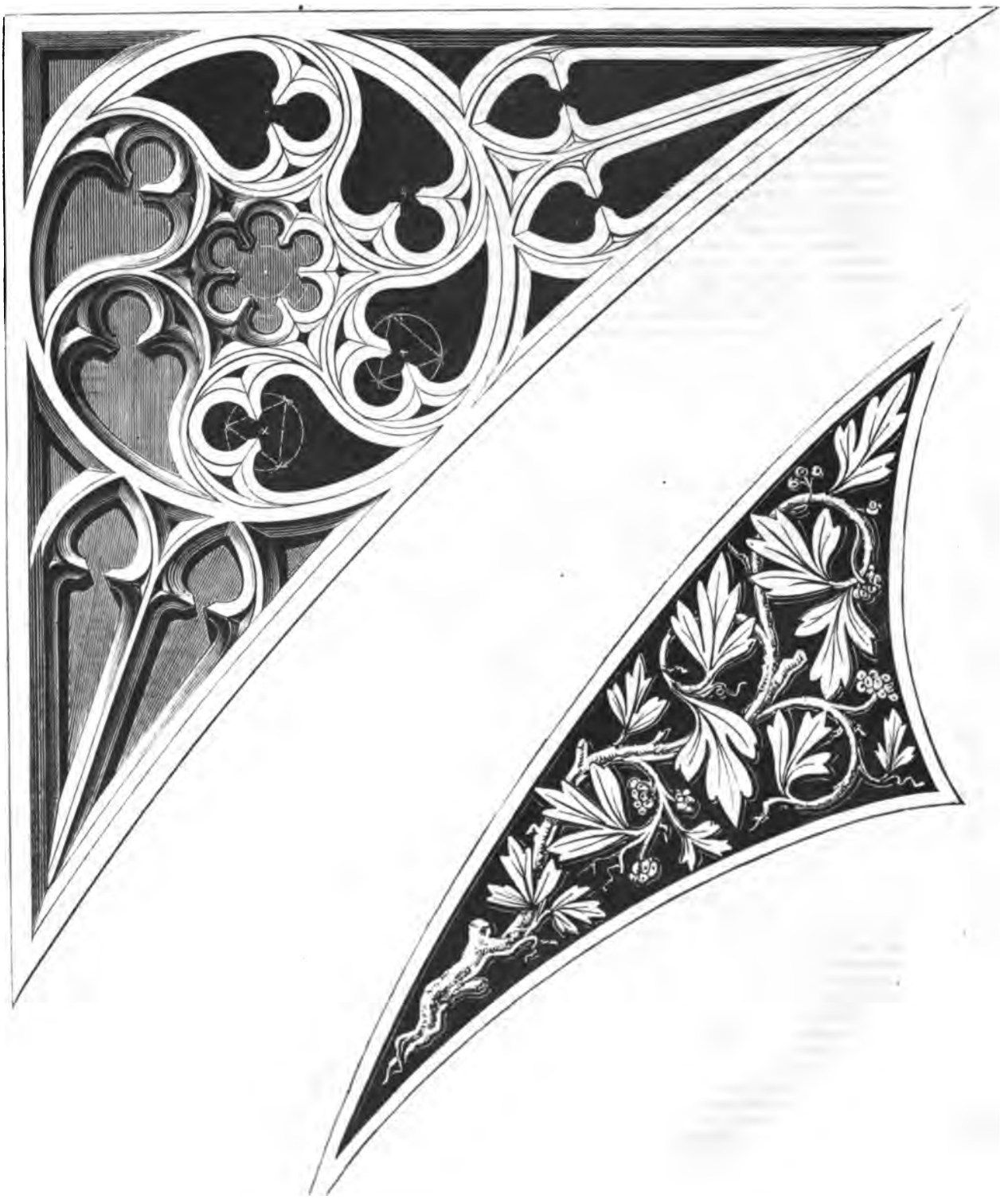
Dr. Hawks, who was attached to the United States' Expedition to Japan, speaks very highly of the anatomical drawings by the Japanese. They shew the muscular development of the horse, both in action and at rest, in lines sufficiently true to nature to prove a very minute and accurate observation, on the part of the artist, of the *external* features of his subject. Thus, in a frieze representing wrestlers, we find that, while preserving in the figure all the peculiar features of the Asiatic stock, the outer angle of the eyes running upward, the small corneas, &c., there is distinctive expression, yet with similarity; and a height of art is reached in the drawings corresponding, in some respects, with what has been found in some of the Nineveh fragments.

As an example of Japanese art we select a child's primer, wherein we find evidence that, unlike the Chinese, the artists of Japan have a knowledge of perspective.

Thus, there is a balcony presented in angular perspective, with its rafters placed in strict accordance with the principle of terminating the perspective lines in a vanishing point abruptly on the horizon. On another page there appears to be some Tartar Hercules, or Japanese St. Patrick, clearing the land of reptiles and vermin, and the doughty destroyer is brandishing his sword in most valiant style. This is drawn with a freedom and humorous sense of the grotesque and ludicrous that are rarely found in similar books prepared for the amusement of children with us. In one of the illustrations there is a quaint old shopman peering through a pair of spectacles stuck upon his nose, and made precisely like the double-eyed glasses just now so fashionable, without any side-wires or braces to confine them to the head: a number of tea-chests are heaped one above another at his side, and the perspective of these is perfectly correct. A glass globe of gold fish, which have awakened the hungry instincts of a cat that wistfully watches their movements in the water, is among the pictures; a couple of chairmen, who have put down their sedan to take rest, are engaged lighting their pipes; and a professor, seemingly of phrenology, is standing amid the paraphernalia of his art—whatever it be—and is taking the measure with a pair of compasses of a bald-headed disciple.

These scenes occur among the illustrations of the little book: all shew a humorous conception, and a style of treatment far in advance of the mechanical trash which sometimes composes the nursery-books found in our shops. The people have made some progress worth studying who have a sense of the humorous, can picture the ludicrous, and good-naturedly laugh at a clever caricature. The constant recurrence on the margin of the pages of these Japanese books of what is usually called by architects the Greek fret or border, is certainly curious. We are surprised by classic form that we would not have expected to find an established feature in Oriental art. Not less surprising, also, is to find another architectural form belonging to what is usually termed the Gothic style. Again, in one of the tailpieces is delineated, on a gong, the perfect representation of the trefoil of the modern architect; it is an accurate copy from the original. These are singular coincidences.

GUILLOCHES



SPANDRILS (GOTHIC).

Encaustic Tiles.*

IT was during the last century only, that the attention of antiquaries became specially directed to the ancient tiles to which the designation of encaustic has been given, and which were very generally adopted by the architects and builders of the middle ages to form the pavements of churches and other structures throughout our native country and some parts of France, especially Normandy. The earliest which have been found have apparently belonged to the latter part of the twelfth century, but it appears from the excellence of the manufacture, the quality of the remains, and the beauty of the designs, that the culminating point of excellence and popularity was attained during the thirteenth. Examples have been found in Ireland, Scotland, and all parts of England, and notably in the latter country at Westminster, Gloucester, Malmesbury, Salisbury, Romsey, Malvern, Tintern, Winchester, Tewkesbury, and Chertsey; the specimens which belonged to the last-named place being the most admirable, in point of manufacture, of any which I have yet had an opportunity of studying. Another beautiful specimen is the pavement in the Chapter House at Westminster, and it is also one of the earliest, its date being coeval with that of the building it decorates.

Much variety of design is to be found in tiles of this description, owing to the fact that their manufacture was apparently carried on by almost every religious house which possessed clay of a proper description for the purpose. The devices generally found upon them consist of armorial bearings, mottoes, monograms, ornaments appropriate to the architecture of the building, sacred symbols, and texts of Scripture or pious maxims. In some cases tiles with incised incriptions were used instead of stone slabs to mark the site of graves which lay below the floor of a church.

It would be irrelevant to dwell upon the archæological interest of these reliques of the past, but it is essential to note the important part they played in enhancing the general decorative effect of the finest mediæval interiors. A close examination of many of these tiles, and the discovery, at Great Malvern and St. Mary Wilton, near Droitwich, of two ancient kilns, in which tiles in different stages of manufacture were found, enabled those interested in the matter to predicate almost with certainty the ancient process of manufacture, which appears to have been somewhat as follows.

The moist clay having been well beaten together was compressed into the form of thin squares, which were generally of the size of from four to six inches and one inch in thickness. These were probably exposed to the sun until they had acquired the proper degree of plasticity to retain any design impressed upon them by a stamp, so formed as to indent the ornamental pattern upon the face of the tile. The indented pattern was then filled up with a different coloured clay, which was usually pipe or other white clay. After the tiles were put into the furnace, a thin coating of powdered lead ore, mixed with clean sand, was probably dusted over their surfaces, so as to give a vitreous glaze when withdrawn from the kiln, which gave permanence to the work, and added to the richness of the effect. This glaze gave the white clay a slight tinge of yellow, and added fulness of tone to the red colour which usually formed the ground upon which the pattern was relieved.

The revival of these processes was, I believe, first contemplated by Mr. S. Wright, of the Staffordshire Potteries, about thirty years ago, who took out a patent for it as an original invention. It was some years before any good specimens could be obtained, but he advanced sufficiently to encourage the hope that success might be ultimately attained. This, however, was reserved for Mr. Herbert Minton, who purchased the patent, to effect. He set to work with a thorough English determination to succeed, and with untiring energy and perseverance, notwithstanding repeated failures, and many difficulties and obstacles which presented themselves in his successive experiments, at length succeeded in producing tiles very far superior to those of the ancients. From the above hasty description the problem of manufacturing encaustic tiles does not appear, at first sight, to be attended with any great difficulty or complexity; in practice, however, in the present day the case is very far different. In the first place, clays have to be mixed to burn with certainty to uniform tints throughout their bodies. In the second, each of these bodies requires different tempering, so as to correct the irregularities of shrinkage induced by the diversity of materials mixed with the clays to obtain the required colours, so that the filling-in in one-coloured clay shall not pull away and "craze" all over, or detach itself from the incised base into which it is to be fixed by firing. In the third place, the range of colours used by the potters of the middle ages was limited to two—buff and red. Gradually, Mr. Minton added to this range—marone, cream colour, black, gray, and fawn, in through coloured clays; and blue, green, white, crimson, lilac, and purple, in enamels of porcelainous body, floated over portions of the surface of the tile slightly sunk to receive comparatively thin coatings of brilliant colours.

The difference in the shrinkage of the clays, while merely drying, or from simple evaporation, and while they are exposed to the heat of the fire, is an even more difficult problem than that involved in the adjustment of the materials for a compensating balance-wheel to a chronometer, or a pendulum to a clock, since that which does for the drying may not suit the firing, and *vice versâ*. Dependent upon this nice balance of conditions are not only the cohesion of the surface without any gap or fissure, but the flatness of the tile as a whole. This last quality may be also deranged by the kiln not working equally, so that one side of a tile shrinks before the others. The remedy is chiefly derived from an intimate practical acquaintance with the actual shrinkage of the various materials, and not only so, but also of their various combinations. These last are not always, nor are they often, results that can be calculated from the known constants of the separate materials of which the tiles are composed, since those constants are sometimes deranged by chymical action consequent on admixture. Great practice, based upon costly experiment, can alone give the necessary knowledge.

The great danger which the makers of encaustic tiles have to guard against continually is the impending risk of having a whole kiln full of valuable tiles spoiled in the firing; for, in order to bring out the colour and obtain the requisite hardness of texture the fire must be carried

* From a paper on "The Influence Exercised on Ceramic Manufactures by the late Mr. Herbert Minton," read before the Society of Arts by Mr. M. Digby Wyatt.

to the very verge of destructiveness, and by overstepping that limit but a little, actual destruction to the tiles in the kiln ensues. Moreover, until the kiln is opened, no one can certainly tell what its fate may be. The criterion usually adopted is the shrinkage of "trial pieces," which are tried by a gauge, and as soon as they will drop into the gauge the kiln has been sufficiently fired. Kilns usually take four days and four nights firing, and after that three or four days cooling. The following is a rapid summary of the processes actually employed in Mr. Minton's perfected manufacture. The clay is entirely obtained from the immediate neighbourhood of the Stoke Works, and as was the case in ancient practice, two different varieties are found without any foreign admixtures to produce when fired satisfactory red and yellow colours. Other tints are obtained by adding to these and other bodies various metallic oxides. In order to adjust these bodies to an equilibrium of shrinkage, both in the kiln when fired and after cooling, other materials, such as Cornwall stone and clay, and silex from Kent, &c., are added, and in their nice adjustment, as the greatest risk is incurred so is the greatest skill involved.

After the clays have been properly purified, and brought into a liquid or "slip" state, they are passed through fine lawn sieves, especially those which are to form the surface of the tile. They are then boiled in the "slip kilns" to bring them into a plastic state, ready for the moulder. The pattern which is cast in relief in plaster is placed in a metal frame, of a size sufficient to allow for the shrinkage of the tile in the process of its manufacture (for a square of 6 inches the size of the mould being 6⅛ inches square). The surface of the tile is formed of fine clay flattened out, and a quarter of an inch thick. This being pressed on the plaster pattern, of course receives an exact impression of the design in "intaglio." The requisite thickness of the tile is gained by adding upon this first layer of fine clay, clay of a coarser kind, half an inch thick, covered again by a stratum of the same clay which forms the face, so as to counteract its shrinkage, which would otherwise pull the tile into a curved section. The whole is then put under a press, to give it sufficient solidity. This being done, the colours required in the pattern are added by pouring the coloured clays in a slip state into the parts of the indentation intended to receive them, according to the design. The slips flood the surface of the tile, and thus for a time obliterate the design altogether. In this state they are left three days, until the water has nearly all evaporated, when the surface is carefully scraped and planed until the pattern is again seen, and all unevenness removed; but still there is no great difference of colour discernible in the clays which form the surface of the tile. After this the tile is left in the drying house for a fortnight to three weeks, when it is taken to the oven, and there for 60 hours is submitted to an intense heat, which brings out the colours. The tile is then finished, unless it is required to be glazed, which is done by simply dipping the surface of the tile into the glaze, and then placing it in a glazing oven to be refired.

The requirements of modern art have been met in the production of bright blues, greens, &c., by inlaying with a porcelain body coloured by means of oxides of cobalt and chrome, and a mixture of chrome and zinc. The introduction of the colours involves some not inconsiderable manufacturing difficulties. For instance, there is no red clay known (excepting those of Staffordshire and Broseley) which will satisfactorily bear the amount of fire requisite to bring out some of the last-named vitreous colours, and even with them the risk and loss is frequently serious, and the compensating process varies as the qualities of the clay which forms the body to be inlaid. One of the many causes of the costliness of these vitreous colours as applied to tiles, is the great room tiles so coloured occupy in the kiln, the face of each being protected by a plain tile, which has no value for any other purpose.

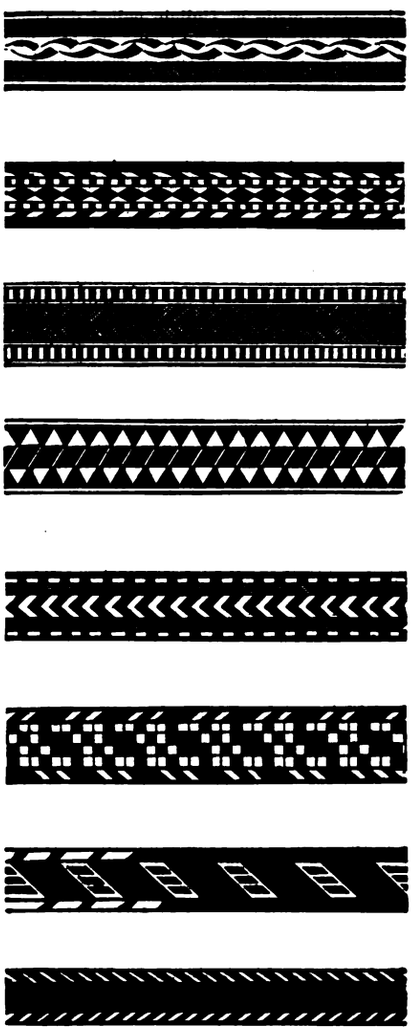
The contact of certain colours in the same tile is usually incompatible; for instance, green next to buff, as the buff is stained by the green. No tiles ought to be fired face to face, as the colours, to use a printer's term, "set off" even where the faces are not in actual contact. The volatilisation of the metallic oxides will produce a clearly defined image of one tile on the face of its opposite; and this vaporisation has a tendency to affect the general tone of colour of the tiles confined in the same "sugar" or fire-clay box in which they are burned.

The evil tendency of substances usually considered the most fixed in nature to resolve themselves into "thin air," under the power of intense heat, compels the potter to saturate with glaze the inside of the sugars in which his glazed goods are fixed, in order to hinder the absorption of the vaporised glaze of his goods by the dry and thirsty substance of the sugars. A glazed tile fired in an unglazed sugar would be robbed of all its lustre, These difficulties have suggested the practice of that slight kind of glazing technically called "smearing," in which the whole quantity of glaze is applied by smearing, not the goods to be glazed, but the inside of the sugar containing them. Heat is applied sufficiently intense to volatilise the glaze, and to prepare the surface of the goods to appropriate it to themselves in its vaporous state. The subdued glaze upon chymists' mortars and upon some encaustic tiles, is obtained by this process.

Veneers.

At a late lecture at the Society of Arts, samples of veneers cut by patent machinery, from Mount Street Works, Nottingham, were introduced, together with specimens of patent printing on wood, in imitation of inlaying and marqueterie work. The thin veneers at present used are cut by a circular saw; in so doing a great waste of material is caused by the width of the saw-cut. This alone causes an additional expense to the purchaser. The loss so occasioned is increased by the chances against an equal thickness of cut by the vibration of the saw in its velocity of revolution. Another principle is the cutting a soft wood into thin slabs, termed "scaleboards," for box makers, which being covered with a thin paper, prevents its splitting and forms an excellent substitute for card and pasteboard, besides being cheaper. The great demand for this material at the works of Messrs. Taylor & Goater, of Mount Street, Nottingham, and Wilson Street, Finsbury, drew their attention to the necessity of inventing a machine, the principle of which would enable them to cut scaleboard with greater rapidity and exactness than had heretofore been done. After many trials and expensive experiments, they succeeded in completing a machine, not only for cutting scaleboards, but for cutting with the greatest certainty of evenness and equality of surface every description of foreign and valuable woods into veneers of various gauges, suitable for every description of internal decorations, in widths of five feet and many

yards in length, bringing out the beautifully ramified figures of the woods, which cannot be produced by any other description of cutting. These veneers are cut by a rotary motion. The wood being fixed in the machine, it revolves spirally against the knife, the gauge being regulated by a peculiar action attached to the machine, by which means it can be governed to produce veneers 80, 60,

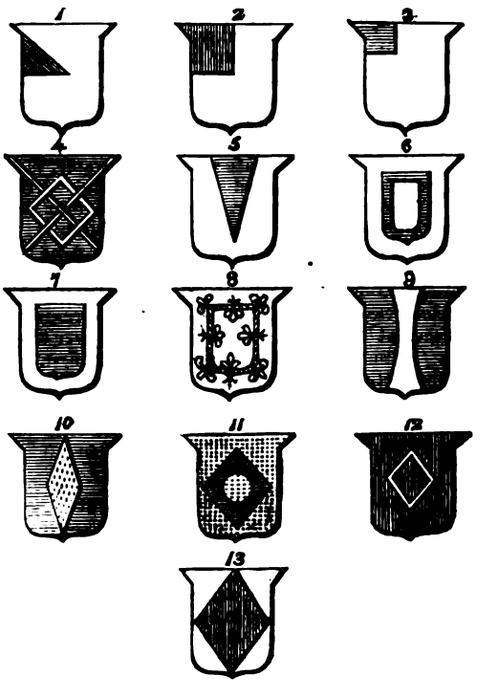


40, and 20 cuts to the inch, never ceasing until it comes to the core of the tree. These veneers are cut with precision and smoothness, requiring little or no preparation for polishing. The specimens exhibited at the Society's rooms surprised all who saw them, not only for the beauty and cleanness of the cut, but also for the beautiful figure of the wood. In many instances, figures are obtained in even bay mahogany, which cannot be cut in any other way; therefore, these veneers must prove a great boon to the cabinet maker and workers in fancy woods. They require but little glue for fixing, and when down, by cleaning off with a little glass paper, the work is ready for polishing. Having succeeded thus far, the proprietors and patentees adopted another department of useful art, namely, the printing by surface pressure patterns on these veneers, by which means the most beautiful imitations of marqueterie work can be produced; thereby adding beauty of ornamentation to articles of utility, as well as for interior decorations of rooms, substituting the real material, in lieu of graining, and at a much less price, for fittings of ships' cabins, superior shop fittings, loo tables, worktables, dressing cases, writing desks, workboxes, draught, chess, and backgammon boards, clock cases, and every article for which fancy woods are applicable. We engrave a few specimens of borders for small work. We shall shortly present a page engraving of an inlaid table top, which can be supplied either in quantities or singly to small purchasers, or on plain veneers for general purposes, at less than half the usual cost. It will no doubt be most extensively used for tablets and show boards for railway purposes and panelling in hotels. Every information as to quantities and prices can be obtained at the London establishment, 31, Wilson Street, Finsbury; where designs are made, and submitted, under the management of Mr. John Page.

Heraldic Blazon.

(*Continued from page* 59.)

Subordinaries are of ancient use in arms. They are—1, gyron; 2, quarter; 3, canton; 4, fret; 5, pile; 6, orle; 7, inescutcheon; 8, tressure; 9, flanche; 10, fusil; 11, rustre; 12, mascle; 13, lozenge.



(To be continued.)

Fresco Painting.

(*Continued and concluded from page* 57.)

Sir C. L. Eastlake offers the following remarks on practical fresco painting in his "Materials for a History of Oil Painting:"—

"Fresco painting requires, as is well known, to be executed in portions; the surface of fresh plaster, which is laid on when the painter is about to begin his day's work, must be covered and completed as a portion of a picture before such plaster is dry; and so on until the whole design is executed. Some ingenuity is necessary to conceal the joinings of the several portions: it is generally contrived that they shall coincide with lines in the composition, or take place in shadows. Their existence is, however, unavoidable, and these divisions in the patchwork (for such it may be called), of which all works of the kind must consist, are among the tests of fresco painting, properly so called. Whenever the extent of a surface of plaster, without a joining, is such that it would be impossible to complete the work contained in it in a day, it may be concluded even without other indications, though such are seldom wanting, that the mode of execution was not what is called 'buon fresco.'

"Walls decorated by the earlier Italian masters exhibit no joinings in the plaster having any reference to the decorations upon them. The paintings must consequently have been added when the entire surface was dry; and must either have been executed in tempera, or if with lime, by means of a process called 'secco' (or sometimes 'fresco secco,' as opposed to 'buon fresco'), which is still commonly practised in Italy and in Munich. The method has been thus described:—The plastering having been completed, and lime and sand only having been used for the last coat, the whole is allowed to dry throughly. It is then rubbed with pumice stone, and the evening before the painting is to be commenced, the surface is well wetted with water in which a little lime has been mixed. The wall is again moistened the next morning; the cartoons are then fastened up, and the outline is pounced. The colours are the same as those used in 'buon fresco' and are mixed with water in the same way, lime being used for the white. 'Work done in this way,' says Mr. Wilson, 'will bear to be washed as well as real fresco, and is as durable. For ornament it is a better method than real fresco, as in the latter art it is quite impossible to make the joinings of the plaster at outlines, owing to the complicated forms of ornaments. The work can be quilted and resumed at any time, as the artist has always the power of preparing the surface by moistening it, as at first. But while the method offers these advantages, and is particularly useful where ornamental painting alone is contemplated, it is in every important respect an inferior art to real fresco.'"

GERMAN AND FLEMISH STONEWARE.

From all other fictilia stoneware is distinguished by the density and hardness of its paste, and by its capability of dispensing with a glaze, though it can receive one. Tradition assigns its origin to the year 1425; it was not, however, until late in the fifteenth century that the decorative features which have elevated the reputation of this ware became general. Brogniart has attempted to attribute particular classes of it to precise localities, but the documentary evidence only justifies its appropriation to the countries in the neighbourhood of the Rhine, on the banks of which is found the clay best adapted to the manufacture. A pilgrim's bottle has been found, which from its general character may be regarded as a work of 1480, and from the allusions to Aken (Aix-la-Chapelle) which it presents may be considered as a production of that city. While on the subject of Aix reference may be made to one of the Lansdowne MSS., in which Garret Tynes of that city is mentioned as having supplied all the Low Countries with "the potts made at Cullein called drinking stone potts," and that in the year 1581 only he imported them into England. A vessel in the Museum of Economic Geology, dated 1594, and stamped with the arms of Queen Elizabeth, has created an impression that at this period England was not dependent on Cologne for its stonewares; but a similar vessel in the collection of Mr. Ralph Bernal, on which occur the same arms, accompanied by those of Cologne, would lead to an opposite conclusion. The stone pots commonly found in England are distinguished by a rotundity of body, and a short neck, on which is a bearded mask. In the reign of James I. and subsequently they were called "Bellarmines," in derision of the Cardinal of that name. In contradistinction to the rude vessels just described, some exhibit quaint or elegant forms elaborately embossed with subjects of figures and arabesques, and some of these of a pearly gray colour, and in the shape of an elongated truncated cone are the purest in design and most highly finished. The fashion of enamelling stoneware became prevalent towards the close of the seventeenth century, but is proved by an isolated example to have been adopted as early as 1630.

LITHOPHANOUS PICTURES.

These are manufactured of the finest, the most translucent porcelain. If a mould is carefully formed in which all the lights of the design are in relief, and all the middle tints and shadows in intaglio, it will be seen, if a porcelain body is uniformly spread over this, that all the high lights will be very thin, whilst the mean shadows and deeper lines will be of varying but gradually increasing thickness; consequently as the light is more or less obstructed in its permeation of the porcelain tile, it represents all those effects of light and shade which constitute representations of natural objects. The baking of these interesting specimens of the potter's art is attended with great difficulty. Some attempts have been made to produce the same effect by reflected light, but the result has not equalled in picturesque effect that produced by those arranged for transmitted radiations. To illustrate more perfectly our description of the manufacture of these lithophanous images, we venture to suggest as examples some pleasing effects of a similar character, which can be produced by placing different thicknesses of paper upon each other, or still better, of thin parchment. It is curious, that if we cement together three pieces of parchment, so that they overlie each other, and thus present three different thicknesses for the passage of light, and then place the compound piece, so that the sun shines through it, taking care only to cut off the light around the edges, by placing it behind a hole in a board, or some opaque body, that we not only have three distinct shadows, but each thickness presents an actual tint; colours—yellow, red, and blue—fading into black, present themselves. With a little ingenuity this arrangement may be made to produce many most pleasing effects, which are in all respects similar to the porcelain pictures above described.

ENCAUSTIC TILES.

CENTREPIECE (GREEK).

Architectural Colouring.

By Sydney Smirke, A.R.A.

THE learned are much divided in their opinions as to the extent to which Greek architects availed themselves of colour in exterior architecture; and, indeed, until comparatively late times, little regard was paid to the subject. The earlier revivers of Greek art seem scarcely to have heeded it, and the natural effects of neglect and exposure, more or less, to the action of the atmosphere during 2,000 years, have of course been so nearly to obliterate all vestiges of colour, that it is not surprising that the earlier observers should have overlooked them.

Authorities differ, even now, so widely as to the extent and character of the colouring practised by the Greeks, and the existing visible traces of colour on ancient remains are so scanty, that he would be a bold theorist who would venture to speak with confidence of the general practice of the Greeks.

The existing evidences of the use of bright colours in Greek sculpture are such as to preclude all doubt of the practice in that department of art. I would instance the red colour known to have been used to mark the bleeding wounds of Greek warriors in archaic sculpture, and the blackened pupils of their eyes. Indeed, the fact of bronze bridles and javelin-heads occurring in marble sculpture of the highest class affords presumptive proof of the use of colour; for detached spots of bronze, unsupported by some accompanying colour, on a pure white marble, are hardly reconcileable with the refinement of Greek art. The somewhat lavish use of gold and ivory in Greek sculpture, at least in its latter days, seems also to favour this inference.

Seeing that in the composition of Greek temples the architect and the sculptor worked so strictly together that the two arts were animated, as it were, by one soul, there seems ample ground for conjecture that the architectural features were treated in the same way as the sculptural portions. In truth, undeniable traces of bright colour have been occasionally detected, and few collections of Greek antiquities are without them. We need go no further for evidence than that afforded to us by the careful, trustworthy, and judicious investigations of Mr. Penrose.

But even on that distinguished testimony we need not now rely; for, thanks to the successful labours of Mr. Charles Newton, architectural painted fragments of the date of Alexander have been recently brought home and deposited in our National Museum.

That this strong colouring extended over large surfaces in Greek architecture is, however, by no means proved. At the same time, I admit that, much as the pure crystalline translucency of Parian marble would lose by any artificial stain, yet the force of evidence renders it undeniable that at least light general tints were largely used. It would be tedious here to enter into a disquisition that has already filled some volumes. I will confine my remarks to the testimony of my own experience. The coarse limestone, of which the finest temples of Magna Græcia were built, appears to have been covered with a thin coat of fine calcareous plaster; this plaster was itself so perfectly white, that it is quite impossible to believe it to have been left unstained. It is not to be supposed that the susceptible eye of a Greek artist could have endured in that brilliant atmosphere so painful an object as a chalky, opaque, white building.

By a somewhat remarkable coincidence the "vermilion beams" of a royal palace are named both in the Iliad and in the Book of Jeremiah, and there is indeed abundant evidence to satisfy us that reds, blues, and yellows, in dazzling superabundance, characterised the immature art of those early periods.

What the Greeks taught by their example we may safely assume their Roman pupils readily practised. But the Romans introduced a new element of decoration, in the profuse use of materials naturally coloured.

Bronze and gilt decorations had, as we have seen, previously enriched the external architecture of Greece; but the Romans, by adding coloured marbles, gave an aspect to their structures to which architecture had previously been a stranger.

The use of these marbles, applied both to architecture and sculpture, became a passion in Rome, and the mountains of her remotest colonies were ransacked for the sake of their many-coloured contents, and the mechanical dexterity acquired by Roman artists in veneering with these precious materials in the thinnest possible laminæ, seems to have far excelled the workmanship even of the present day.

When the tide of conquest rolled eastward, the use of colour in architecture acquired renewed force. It is worthy of observation that those Eastern regions, where all the works of nature seem steeped in the brightest colouring, are peopled by races whose greatest æsthetic characteristic has always been a love of brilliant colouring. Their architecture and their costume alike attest this prevailing taste. Nor was it characteristic of any special race or caste. It was a geographical rather than a national distinction. Whether Jew or Gentile, worshipper of Vishnoo or of Mahomet, all alike delighted, and I may say still delight, in the most brilliant colours, seeking the highest qualification of this sense by reproducing in the texture of their dresses, or on the surface of their edifices, those precious gems which were so strongly associated in their minds with the symbols of rank, and wealth, and power.

There can be little doubt that it was from these Eastern sources, far more than from the surviving examples of Roman art, that mediæval builders learned the value of colour in architectural decoration.

It is probable that during the least advanced ages of our art even this taste found but slight encouragement beyond the rude efforts of mural decorators in mosaic, or the painted effigies of saints and their symbolic accompaniments. As art, however, advanced, the builder again recognised the value of colour in enhancing the effect of his works.

But now the influence of climate on the predilections of the eye came into operation. Mediæval art was born and nurtured amidst the gray mists and under the clouded skies of the North, and art assumed a graver tone, a more sombre character. Whilst the exterior architecture of Byzantium, of Persia, and of India shone in all the splendour of coloured decoration, we find it but timidly and very moderately used in the North of Europe; and this distinction is perceptible even within very narrow geographical limits: in France, for example, whilst in the early mediæval buildings of the more northern provinces few traces of external coloured decoration occur. Mosaic and tesselated works are not unfrequently found in those

provinces where ancient colonies from the East had imported an exotic taste. In Germany I am aware of but few indications of such mode of coloured exterior ornamentation; whilst on crossing the Alps, we begin to find, at Venice and elsewhere, rich marble incrustations very frequently used, evincing the intimate relations of the Venetian States with Byzantium and the East. In England there is but little evidence of any taste for exterior colour in architecture, unless, indeed, we class under this species of superficial ornamentation the practice, prevalent in the eastern parts of England, of chequering the surface with flintwork inlaid or embedded in the masonry of the walls, offering a strong contrast in tone, if not in colour, to the general hue of the building.

Closely allied to this mode of decoration are the interlacing courses of brickwork; but the practice was unknown (in England, at least) until the latter days of middle age art, although we see such interlacings at Venice in the fourteenth century. The horizontal courses of variously-coloured materials—a mode of decoration to which recourse has been had of late in this country—are a prevalent feature of the buildings of parts of Italy and in the East; but, as far as I know, they are a peculiarity foreign to English art.

I must, however, admit that these observations on the general absence of bright colours in Northern architecture require much qualification when we consider the decoration of the interior of buildings. There, the love of colour, which more or less characterises the natural taste of all mankind, has, I think, in all climates and at almost all periods been largely indulged. Even in the most unfavourable times artists in mosaic have been found to illuminate, with more or less of skill, the walls of ecclesiastical buildings, and their art was among the earliest to participate in the general improvement of architecture.

Perhaps interior coloured ornamentation reached its acme when the Sainte Chapelle, in Paris, and subsequently when our own Saint Stephen's Chapel, were built. But it should be noted that these beautiful examples were preceded by the chapel of Saint Francesco, at Assissi, where an example was set of the most elaborate and brilliant mural illumination—an example which, by its own intrinsic beauty, as well as by the reputed sanctity of the spot, probably influenced all Christendom. I am aware that the crowning decorations of the Italian example being by the hand of Giotto, bear a date later than that assigned to the Sainte Chapelle, at Paris. But the building was erected long before, and having been executed with incredible rapidity it may be fairly presumed that the mural decorations were at least far advanced before the Parisian work, by Montreau, was begun. The beautiful building at Assissi may, therefore, I think, be safely said to have led to the splendid rival displays which I have already adverted to in Northern Europe.

Abundant further examples might be adduced illustrating the passion for bright colouring which distinguished the artists, of probably, the whole period called the middle ages throughout Europe; and when the style that had prevailed for some centuries began to recede before the revived spirit of classic art, architectural colourists still retained the practice of their art, although they gave it a new direction.

Italy still took the lead. There we find coloured marble incrustations, both external and internal, more prevalent than ever, and panelling in various coloured marbles and jaspers is one of the most strongly-marked features of the quarto-cento and cinque-cento schools. I may mention as striking and well-known examples, portions of the Ducal Palace and adjacent buildings at Venice; the church of Sta. Maria dei Miracoli in the same city, and that of Sta. Maria at Florence, with very many other remarkable buildings.

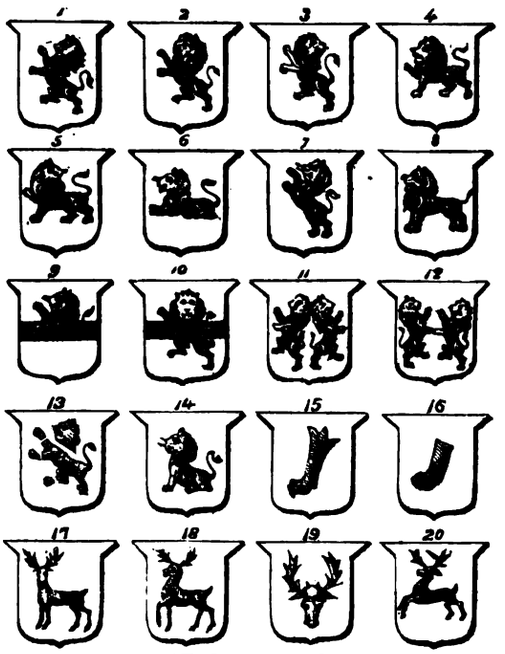
Nor did the use of coloured marbles cease for a long time to be a fruitful source of beauty and variety in the architecture of Europe. It was in the beginning of the sixteenth century that the pleasing style of interior decoration became prevalent which has been named after the great master whose skilful hand and fascinating example first recommended it.

The story told by Vasari of Rafaële having derived the idea of his arabesques from the casual discovery of ancient Roman decorative paintings, is familiar to all. We may readily admit the probability of the story, for the subsequent disinterments at Pompeii and Herculaneum, and in the Roman states, abundantly testify to the general practice of ancient Roman art. This epoch is a memorable one in decorative art. It is curious to trace over all Europe, and through three centuries, the permanent wide-spread influence that the school of Rafaële has exercised over the whole domain of art.

Heraldic Blazon.

(*Continued from page* 91.)

Charges:—1, rampant; 2, rampant guard; 3, rampant regard; 4, passant; 5, passant regard; 6, couchant; 7, saliant; 8, statant; 9, naissant; 10, debruised; 11, addorsed; 12, combatant; 13, dismembered; 14, sejant; 15, erased; 16, couped; 17, at gaze; 18, tripping; 19, cabossed; 20, courant.



(To be continued.)

Porcelain.

Porcelain is the most beautiful and the finest of all earthenwares. The art of making it is one of those in which Europe has been excelled by Oriental nations. The first porcelain that was seen in Europe was brought from Japan and China. The whiteness, transparency, fineness, neatness, elegance, and even the magnificence of this pottery, which soon became the ornament of sumptuous tables, did not fail to excite the admiration and industry of Europeans. It would perhaps be a fruitless undertaking to inquire into the history of the several attempts made in Europe to imitate the original porcelain, as most of these are unknown and would lead us too far from the subject. Macquer is of opinion that the first European porcelains were made in Saxony and in France, and afterwards in England, Germany, and Italy. But as all these were different from the Japanese, so each of them had its peculiar character.

The illustrious Reaumur first attended to this object among the moderns, and communicated his researches in two memoirs to the Academy of Sciences in 1727 and 1729. This great experimental philosopher took the best method of arriving at a thorough knowledge of the subject; and although he was mistaken in some points, and neglected to consider some of the essential qualities requisite to constitute good porcelain, he is nevertheless the first person who published any distinct notions upon the subject. He did not satisfy himself with considering the external appearance, the painting and gilding, which are only ornaments not essential to the porcelain, but he endeavoured to examine it internally: and having broken pieces of the Japanese, Saxon, and French porcelains, he examined the difference of their grains (which name is given to their internal structure). The grain of the Japanese porcelain appeared to him to be fine, close, compact, moderately smooth, and somewhat shining. The grain of the Saxon or Dresden porcelain was found to be still more compact, not granulous, smooth, shining like enamel. Lastly, the porcelain of St. Cloud had a grain much less close and fine than that of Japan, not or but little shining, and resembling the grain of sugar.

From these first observations he perceived that porcelains differed considerably. That he might examine them further, he exposed them to a violent heat. More essential differences than those of the grain appeared upon this trial; for the Japanese porcelain was unaltered by the fire, and all the European were melted, as Reaumur says.

This essential difference betwixt the Japanese and European porcelains suggested to Reaumur a very ingenious thought, and in many respects true, concerning the nature of porcelain in general. As all porcelains somewhat resemble glass in consistence and transparency, though they are less compact and much less transparent, this philosopher considered them as semivitrifications. Now every substance may appear, and may actually be in a semivitrified state in two ways; for, first it may be entirely composed of vitrifiable or fusible matters; and in this case, by exposing it to the action of fire, it will be actually melted or vitrified, if the heat be sufficiently strong and long continued. But as this change is not made instantly, especially when the heat is not very violent, and as it passes through different stages or degrees, which may be more easily observed as the heat is better managed; hence, by stopping in proper time the application of heat to porcelain made in this manner, we may obtain it in an intermediate state betwixt those of crude earths and of completely vitrified substances; and also possessed of the semitransparency, and of the other sensible qualities of porcelain. We know also that, if such porcelain be exposed to a stronger degree of fire, it will then be completely fused and entirely vitrified. But most of the European porcelains have this fusibility; from which Reaumur concludes, that their composition is founded upon the above-mentioned principle.

In the second place, a paste of porcelain may be composed of fusible and vitrifiable matter, mixed with a certain proportion of another matter, which is absolutely infusible in the fires of our furnaces. We may easily perceive that, if such a mixture be exposed to a heat sufficient to melt entirely the vitrifiable ingredient, this matter will actually melt; but as it is intermixed with another matter which does not melt, and which consequently preserves its consistency and opacity, the whole must form a compound partly opaque and partly transparent, or rather a semitransparent mass, that is, a semivitrified substance, or porcelain, but of a kind very different from the former; for, as the fusible part of this latter has produced all its effect, and as it has been as much fused as it can be during the baking of the porcelain, the compound may be exposed a second time to a more violent fire, without approaching nearer to a complete vitrification, or without departing from its state of porcelain. But as Oriental porcelain has precisely these appearances and properties, Reaumur concludes with reason, that it is composed upon this principle; and he afterwards confirmed his opinion by undeniable facts.

Father Entrecolles, missionary at China, had sent home a summary description of the process by which the inhabitants of that country make their porcelain, and also a small quantity of the materials which they employ in its composition. He said, that the Chinese composed their porcelain of two ingredients, one of which is a hard stone or rock, called by them petuntse, which they carefully grind to a very fine powder; and the other, called by them kaolin, is a white earthy substance, which they mix intimately with the ground petuntse.

Reaumur examined both these matters, and having exposed them separately to a violent fire, he discovered that the petuntse had fused without addition, and that the kaolin had given no sign of fusibility. He afterwards mixed these matters, and formed cakes of them, which by baking were converted into porcelain similar to that of China. Reaumur easily found that the petuntse of the Chinese was a hard stone of the kind called vitrifiable, but much more fusible than any of these which were known in Europe, and that the kaolin was a talcy matter reduced to very fine powder. From that time he hoped to make a porcelain of the same kind as the Chinese, with materials found in France. Whether he could not find any materials equal to those of China, particularly that material analogous to the petuntse of the Chinese, or whether other occupations prevented the continuance of his researches, we do not know; but we find from his second memoir upon porcelain, that he afterwards attempted to make an artificial petuntse, by mixing our vitrifiable stones with salts capable of rendering them fusible, or even by substituting for it glass ready formed, and by adding to these such substances as he thought might be substituted for kaolin. But he probably found that he could not execute these intentions, for he did not resume this subject from the year 1729 to 1739, when he gave a process for converting common glass to a singular kind of porcelain, to which he has given his name, and of which we shall give a description.

Having made many experiments to discover the nature of the materials which enter into the composition of the Oriental porcelain, and having ascertained that all porcelain is an intermediate substance betwixt an earth and glass, Reaumur very ingeniously thought of reducing glass ready made to the state of porcelain, by reversing the effect of the vitrification, or partly unvitrifying it; hence this kind of ware has been called porcelain unvitrified. Reaumur gave the quality of porcelain to glass, that is, he rendered glass of a milky colour, semitransparent, so hard as to strike fire with steel, infusible, and of a fibrous grain, by means of cementation. The process which he published is not difficult. Common glass, such as that of which wine-bottles are made, succeeds best. The glass vessel which is to be converted into porcelain is to be inclosed in a baked earthen case or seggar. The vessel and case are to be filled with a cement composed of equal parts of sand and powdered gypsum or plaster; and the whole is to be put into a potter's kiln, and to remain there during the baking of common earthenware; after which the glass vessel will be found transformed into such a matter as has been described.

This kind of porcelain has not a very white colour, particularly on its surface; but for some purposes it may be useful, especially for chymical vessels. Reaumur has not explained how this transformation is effected. Macquer imagined, that the sulphuric acid of the gypsum quits its basis of calcareous earth, and unites with the alkaline salt and saline earth of the glass, with which it forms a kind of salt, different from the sulphate of lime, by the interposition of which matter the glass acquires the qualities of porcelain.

Window Glass.

The following curious information respecting the manufacture of glass in England more than three half centuries ago, is gathered from a little technical work of the period, entitled "The City and Country Purchaser and Builder's Dictionary:"—

"There are various sorts of glass which are made use of in the world; but at present I shall confine myself to speak only of those sorts which glaziers commonly work upon here in England, which are these following, namely: 'crown glass,' which is of two sorts, 'Lambeth,' and 'Ratcliff,' 'French,' or 'Normandy glass,' 'German glass,' of two sorts, 'white' and 'green,' 'Dutch glass,' 'Newcastle glass,' 'Staffordshire glass,' 'Bristol glass,' 'looking glass,' 'jealous glass.'—Ratcliff crown glass is the best and clearest. It was first made at the bear-garden, on the Bankside in the year 1691. I had it published in the *Gazette* for June 15, &c., where it is commended in this manner, and called 'crown window glass,' much exceeding French glass in all its qualifications. The manufactory was afterwards removed to Ratcliff. This sort of crown glass is of a light sky blue colour. Lambeth crown glass is of a darker colour than the Ratcliff, inclining to a green.—The French glass is thinner and more transparent than Newcastle glass, and is of a dirtyish green colour.—The qualities of the white and green German glasses are denoted by their names. They are made straighter and more free from blemishes than Newcastle glass.—The Dutch glass is crooked and very defective in transparency.—The Newcastle glass is of a kind of an ash colour. It is the glass that is most in use here in England; but it is subject to have specks and blemishes and streaks in it, and it is very often warped crooked. This glass is brought to London in cases or slight frames of sticks, fixed at some distance one from another. They are conveyed in the coal ships, being set on end in the coals, by which means they are kept steady from falling and breaking by the rolling of the ship. The price of Newcastle glass is uncertain; for when coals are plentiful, then glass is cheap, and when the coals are dear at London, then Newcastle glass is so likewise: not that they want coals at Newcastle, but because they have no other conveyance for it to London excepting the collier vessels.—Staffordshire glass is but seldom used in London.—Bristol glass is as cheap and better than Newcastle glass; but as they have not the means of sending it by sea, as they have from Newcastle by coal ships, it is very rare to have any of it in London.—Looking glass plates are made at the bear-garden, on the Bankside. These looking glass plates are ground smooth and flat, and polished. They are sometimes used in sashes or sash-windows; but it is a clear sort of glass, for they ask 4s. a foot for such squares, and if they are large the cost is much more.—Jealous glass is wrinkled, so that nothing can be seen distinctly through it. It is not popular with the glass melters, for they say it wastes glass too much for their profit.—Woolwich glass was one kind of our English glass, manufactured at the place from which it derived its name; but the works there have been long discontinued."

PALISSY WARE.

This ware takes its name from Bernard of Palissy, a native of Chapelle-Biron, in France, who, on seeing an enamelled earthenware vessel, turned from his profession as a surveyor and glass-painter to prosecute the pursuit of a white enamel with which to cover pottery; and though he never attained his aim, he succeeded, after fifteen years of intense labour and constant sacrifice, in discovering a kind of enamel in imitation of jasper, which he eventually adapted to earthenware objects in relief. Improving afterwards on this, he produced what he denominated *rustic pieces*, which consist of vessels having upon them reptiles, fish, insects, plants, and fossil shells in relief, and in their natural colours. There exist also by the same artist arabesque ornaments in relief, and of varied colours, and others that are perforated; some of the former made after the designs of François Briot. He likewise executed figures and statuettes, some of them for garden decoration. He secured the patronage and favour of the French Court, but was not saved from paying the penalty of his Huguenot principles in prison, where he is supposed to have died in 1589. His art was continued by Nicolas and Mathurin Palissy. It has been pretended that certain embossed and enamelled earthenwares assigned to Nuremberg, were suggested by the operations of Palissy; but it must be remembered that they may have been derived from the embossed-stone ware of Germany, if not at an earlier period from the productions of the Della Robbias.

PANELS.

THE CHRISTMAS HYMN

HARK, the herald angels sing,
Glory to the new-born King,
Peace on earth, and mercy mild,
God and sinners reconcil'd!
Joyful all ye nations rise,
Join the triumph of the skies,
With th' angelick host proclaim,
Christ is born in Bethlehem.
HARK, the herald angels sing,
GLORY to the new-born King!

HAIL the head'n-born Prince of Peace!
Hail the Sun of righteousness!
Light and Life to all he brings,
Ris'n with healing in his wings.
Mild he lays his glory by,
Born that man no more may die:
Born to raise the sons of earth,
Born to give them second birth.
HARK, the herald angels sing, &c.

Architectural Composition.

AT the fifth meeting of the eleventh session of the Liverpool Architectural and Archæological Society, Mr. Samuel Huggins read the paper of the evening, "On Architectural Composition." Composition in Architecture, he said, might be defined in the same words as composition in painting; invention was the true conception of its subject; composition was the right mode of representing it. There was a difference between composition and grouping, which a man might have ability for without being able to compose, which was, to give the form exactly suited to the subject or purpose, the expression of which should not be lost in beauty of composition, that being but a medium or vehicle of higher things. An architectural composition might be likened to the body of an animal, which was always made of the form best suited to the place it had to fill, and to contain all the needful parts and organs. Infinite were the shapes in which composition might embody its subject and present it to the view. Natural productions—birds, beasts, plants, flowers, minerals, rocks, mountains, statical and dynamical science, laws of the resolution of forces, geometrical forms, properties of building materials—were all sources of suggestions, analogies, and principles of form, proportion, or arrangement in architectural composition. Mr. Huggins entered at some length into the subject of the construction and application of domes. Modern architecture had lost much of grandeur in composition from the supposed difficulty and expense of constructing permanent domes on a scale of any magnitude. The difficulties that had attended the erection of the greatest modern domes had chiefly arisen from elevating them on lofty cylindrical towers, and loading them with stone lanterns of enormous weight, neither of which, he contended, contributed to their beauty. He suggested many modes of treatment and material of construction—as iron, wood, and concrete, stone formed into ribs and panels in the manner of the Gothic vaults; but he believed there was nothing better for domes than bricks or tiles, which, well grouted, would grow together into a mass so rigid that coincidence with the curve of equilibrium would be of small consequence. From the facts stated respecting the nature and quality of the mortar used in India, and the vaults and domes constructed there in concrete alone, the strength of the mortar was evidently the reason of the holding together of the Burra Gumbooz, or great dome of Mahommed Sha's tomb, at Reejapore, which though of beautiful contour, was very unscientific in its form. Mr. Huggins defended the principle of having outer and inner domes. In making the outer one, such moderate additional elevation might be given to it as its due external development above the rest of the roof might require. He spoke in praise of the octagonal form of domes placed over a square building—an excellent example of which, he said, existed in Liverpool at St. Paul's Church, which, if relieved of its odious lantern, would be as fine an application of a dome as he knew in England, or elsewhere. He referred to various forms of roofs, and remarked that the roof in this climate should generally shew itself, and play its part in the composition. He condemned the French roof, which he regretted to find was growing into favour with English artists, observing that a frustum of a pyramid was not only devoid of all grace, but was positively the most hideous conceivable form that could be applied to the summit of a building. Referring to the subject of porticos, and their mode of junction with the body of the building, Mr. Huggins said a portico should always be more or less recessed. Unless it were let in, it could only appear as borrowed finery, without which the building would look more complete. He said a portico never seemed to him completely united unless it occupied the entire of the side of the building, or limb of the building, to which it was attached. Of course a portico occupying the side of an octagonal or hexagonal building as well as a rectangular one, sufficiently complied with the condition. He considered the subject of the optical corrections, discovered to have been made in Greek buildings was one connected with composition, and deserving of the serious attention of designers. He liked the idea of the upward convergence of the axes of the columns, and considered that the principle might be very safely applied in modern works, not only to correct any appearance of overhanging, but to give a little of the look of pyramidising. Mr. Huggins referred to the injurious effect that symbolism and superstition had exerted on architecture in different ages, and said that as a general principle he believed that simplicity in religious faith and practice produced unity and grandeur in architecture.

It was in domestic and other walks of architecture that we were to look for compositions most pure and simple artistically, and true to practical and expressional requirements, unmarred by conventional feeling, or considerations that had no natural connexion with the subject. Of all styles in which examples existed of domestic architecture, he knew none that had realised the *beau ideal* of the comfortable and dignified abode to the extent of our own domestic Tudor and Elizabethan. Elizabethan was, he believed, an improvement on the Tudor in refinement of detail and decoration; and he referred to it from a conviction that nothing would tend more to regenerate domestic architecture in England than a right study, that was a rational and enlightened study, of Elizabethan remains—of its principles rather than its forms. If we took the style in its later period, when almost the entire of the detail had assumed an Italian character, we should see in it much that was logical and admirable in entire conception and composition. It shewed greater mental and imaginative freedom on the part of its architects than has since been exhibited in England. Its turrets, cupolas, gables, perforated parapets, give a charming skyline to a rich and effective composition, while its variously decorated terraces were peculiarly useful features in a damp climate to unite the whole with the foreground. With such members and features as he had enumerated, along with grouped chimneys, which they sought not to hide but made into artistic and beautiful finials—with these, and pinnacles, quoins, and other details of rustication, the Elizabethan builder succeeded in producing compositions which have seldom been equalled for pleasing variety and harmony with the surrounding scenery. In conclusion, Mr. Huggins remarked—"Had we, I mean our forefathers, gone on truthfully from the point at which domestic and

other branches of architecture stood in this country in the reign of the first James, availing ourselves of every new means of improvement and advancement, but using, without abusing, the increasing knowledge of Greek, Roman, and Italian remains, as furnished by the explorations and publications of the Stuarts and others, we should now have something more pleasant to look upon than we have at this day; though I view our present position and future prospects in regard to architecture with a feeling far less of regret or disappointment than of hopeful anticipation."

Glycerine.

By M. Cap.

Glycerine was discovered in 1779 by the celebrated Scheele. This chymist, examining the water which had served for the preparation of simple plaster, that is to say, the saponification of lard by litharge, first observed that this water, concentrated by evaporation, furnished a matter with a soft, sweet taste, of a thick consistence, unctuous to the touch, with but little odour, without either acid or alkaline reaction, and he gave to it the name of *sweet principle of oils*. This matter, which was for some time thought to be of a gummy nature, and which seemed only to have negative qualities, attracted, at first but little attention from chymists. At a later period, M. Chevreul's beautiful investigations into the nature of the fatty bodies generalised the production of this substance, which he named *glycerine*, and shewed that it was a constant product of saponification. He established the principle that the whole of one class of natural fatty bodies, under the influence of alkalies, were decomposable for the production of soap on the one hand, and glycerine on the other. Thus, this matter is produced in abundance, not only in the production of metallic plasters, but in the manufacture of ordinary soap and in that of stearine, that curious and still recent branch of industry, to which we owe stearine candles.

Notwithstanding the abundance in which glycerine is produced in these various operations, no one had yet found any useful employment for it. The mother-liquors of soap works and stearic acid manufactories were daily thrown away and lost. In fact, the glycerine was found in them mixed with so large a quantity of water, that it was difficult to remove it economically. On the other hand, the fatty bodies employed in this last manufacture, contained many foreign substances which were much opposed to the purification of the glycerine derived from this source. The principal difficulty consisted in getting rid of the very disagreeable odour inherent to the mother-liquors from the fabrication of stearic acid. By treating them with a current of carbonic acid, as recommended in works on chymistry, so as to remove the lime which they contain, no success is attained as to depriving them of this dreadful odour, because the lime is combined with the volatile acids (sebacic, butyric, and valerianic), which are found in very considerable quantity in them, and which are disengaged at an elevated temperature.

Thus, after having subjected these mother-liquors to a slight evaporation, and treating them with carbonic acid, if a solution of oxalic acid is poured in, a considerable precipitate is immediately obtained; and, if the temperature is raised at the same time, the disengagement of the volatile fatty acids become more abundant. This observation leads me to the processes by means of which I have been able to produce glycerine in a complete state of purity, processes which I shall now describe in a few words.

I begin by concentrating, by means of evaporation, a given quantity of the mother-liquors of soap works or of stearic acid manufactories, then I determine, by means of oxalic acid, the proportions of lime which they contain. I then add a quantity of sulphuric acid equivalent to that of the oxalic acid necessary for the saturation of the lime. The resulting sulphate of lime is precipitated in an insoluble state. The liquor is decanted and boiled in a wrought iron pot, covered with a thick plate of lead. Care must be taken at the same time to agitate the liquid powerfully by means of an appropriate stirrer moved by mechanical means. The fatty acids volatilise, the liquor begins to lose its colour, and soon loses likewise its disagreeable odour. When it has attained a density of 10° of the areometer it is allowed to cool, and filtered through a cloth to separate a fresh quantity of sulphate of lime. The excess of acid is saturated with a little carbonate of the same base, and the evaporation is continued, still rapidly agitating the liquor. When it has attained by means of evaporation to 24° areometer, a fresh proportion of sulphate of lime is deposited; it is allowed to cool, passed through a cloth, and the deposit washed with water slightly alcoholised.

It is evaporated a third time, continuing the stirring, until the liquor has attained 28° when hot, and 30° when cold. By cooling, a little more sulphate of lime is deposited, which is separated by another filtration. The product is then without odour, the taste is soft and saccharine, it is unctuous, and its colour is slightly buff. In this state it is treated cold with washed animal charcoal, filtered, and the glycerine is obtained entirely without odour, without colour, and of a syrupy consistence.

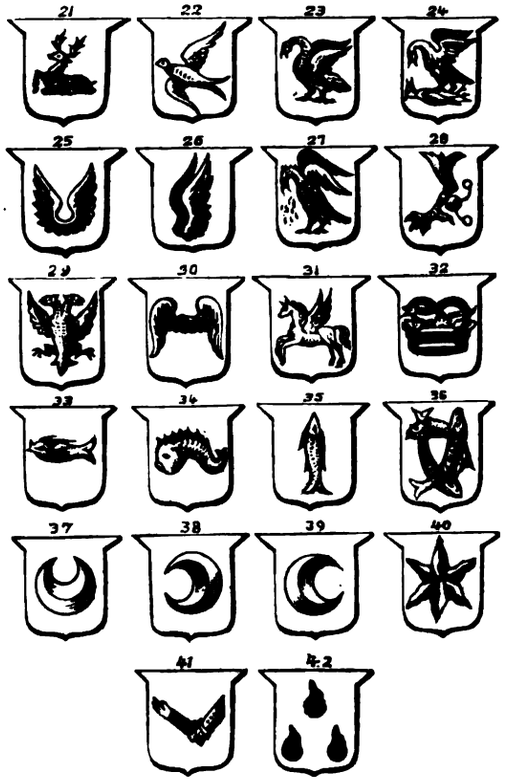
Arrived at this point of concentration (28 to 29 areometric degrees), glycerine is fit for most uses in manufacture. However, it contains a large proportion of water, which is removed with difficulty after a prolonged concentration. When it reaches 31° it has lost from 20 to 25 per cent. In this state, if a piece of cotton is immersed in it, it burns exactly like oil, with a reddish flame. If the temperature is raised, thick vapours are at first disengaged, then it decomposes, forming several volatile products and a mass of charcoal.

The physical properties of glycerine are very interesting, properties so singular that it is astonishing that manufacturers should not sooner have turned them to use. Glycerine neither belongs to the gummy nor the fatty bodies; it is a neutral body *sui generis*, ordinarily liquid and uncrystallisable. Like water, it mixes in all proportions with aqueous liquids, alcohol and vinegar; it dissolves most of the bodies that can be dissolved by water; it is slightly hygrometric and manifests no reaction, either acid or alkaline. Like oil, it is unctuous to the touch, it does not evaporate in contact with air, it does not decompose even at the highest temperature. It mixes in certain proportions with lard and the fatty bodies, it dissolves the volatile oils, it is not susceptible of becoming rancid nor of spontaneous fermentation.

Heraldic Blazon.

(*Continued and concluded from page* 94.)

Charges concluded:—21, lodged; 22, volant; 23, rousant; 24, trussing; 25, inverted; 26, indorsed; 27, pelican; 28, jessed and belled; 29, displayed 30, inverted; 31, pegasus; 32, nowed; 33, naiant; 34, embowed; 35, hauriant; 36, fretted 7, crescent; 38, increscent; 39, decrescent; 40, star; 41, vambraced; 42, gutté.



Technicologia.

168. *Mock Platinum.*—Eight oz. brass, and 5 oz. zinc.

169. *Alloy of Platinum with Gold.*—Fifteen parts pure gold, and one part platinum. The gold must be melted before the platinum is added. This alloy is whiter than gold. Platinum has the singular property of depriving gold of its peculiar colour; if ten parts of gold are combined with only one of platinum, the alloy will appear of the colour of platinum. There is another remarkable property attending this alloy of gold and platinum, that it is soluble in nitric acid, which does not act upon either of the metals in a separate state.

170. *Ring Gold.*—Six dwts. 12 grs. pure copper, 3 dwts. 16 grs. fine silver, and 1 oz. 5 dwts. pure gold. Jewellers' gold is made of variable proportions of pure gold and copper, and sometimes of silver.

171. *Imitation of Silver.*—One lb. copper, and $\frac{3}{4}$ oz. tin. This alloy will be of a deeper colour than silver, but in other respects it is very similar.

172. *Alloy of Platinum with Steel.*—Platinum, although the most infusible of metals, when in contact with steel melts at a comparatively low temperature, and combines with it in any proportion. This alloy does not rust or tarnish by exposure to a moist atmosphere, for many months. The alloy is malleable, and is well adapted for instruments which would be injured by slight oxidation, as mirrors for dentists, &c. The best proportions do not yet appear to be known; but it appears that if much platinum be used, the alloy has a damask or wavy appearance. Steel for cutting instruments is much improved by even $\frac{1}{300}$th of platinum.

173. *Alloy of Silver and Steel.*—Steel, 500 parts, and silver 1 part. If a large proportion of silver is employed, the compound appears to be a mechanical mixture only. The silver is distinctly seen in fibres mixed with the steel, and the alloy is subject to voltaic action. When the proportion does not exceed $\frac{1}{100}$, the compound appears to be a chymical union; the steel is rendered much harder, forges remarkably well, and is infinitely superior to the best cast steel for cutting instruments, &c.

174. *Alloy of Steel with Rhodium.*—If from 1 to 2 per cent. of rhodium be combined with steel, the alloy possesses great hardness, with sufficient tenacity to prevent cracking, either in forging or hardening. This alloy requires to be heated about 73° F. above the best English cast steel in tempering. It is superior to that metal; but the scarcity of rhodium will prevent the extensive use of this valuable compound.

PERFECTION OF GENIUS.

It is not given to any one mind, not even to that of Shakespeare or Goethe, to excel at once in every branch of literature; universality of fame is a proof of universality rather than perfection of Genius. Every one finds something that gratifies his taste, or strikes his intellect; but none find their expectations entirely gratified, their aspirations with nothing left to conceive. Had Rafaëlle given to the world the sunsets of Claude Lorraine, the rocks of Salvator Rosa, the battle-pieces of Lebrun, and the boors of Teniers, as well as his Holy Families, he would have been admired by a wider circle, but he would never by common consent have been placed at the head of the art of painting. Some part of one quality would have insinuated itself into the works produced by another; the vulgarity of Teniers' group, the luxuriance of Titian's figures, would have marred the chastity of his divine conceptions. The true mark of the highest class of genius is not universality of fame, but universal admiration by the few who can really appreciate its highest works.—*Alison.*

Roman Villas.

In the Roman Villa after Vitruvius, the prothyrum, vestibule, or lobby, was the first object; contiguous to this was the porter's lodge, inscribed with the caution, "Cave Canem," Beware of the Dog. The porter was a slave chained to his post. The dog was sometimes merely a painting of the animal on the wall, or a representation in mosaic. In the country, it is rational to suppose that a real Cerberus would guard the porch of the villa. The atrium, or covered hall; here the domestics and retainers of the family congregated. In the centre was an open space, styled the "Impluvium," in which was a tank, compluvium, for retaining the rain-water falling from the roof. The peristyle, or inner court, was surrounded on all sides, as its name implies, by a colonnade; in the centre was a cistern for gold and silver fish, or an ornamental fountain. A xystus, or parterre of shrubs and flowers, filled up the remainder of the open space.* On either side of the peristyle were the cubicula, or apartments of the family; the pinacotheca, or picture gallery; the bibliotheca, or library; the exhedræ, spacious parlours, or locutories. The oeci, or saloons, of which, it is stated, there were several, are defined as banquetting-rooms, and were painted with designs, from which each particular room received its name, as the Hall of the Seasons, &c. The triclinia were dining-rooms. Asarotos oecus, the unswept room, was a name once given to a triclinium, on account of the singularity of the design of the mosaic pavement, which, by the caprice of the artist, was made to represent all kinds of fragments of a feast. A pavement of this kind, it may be remarked, was lately discovered at Rome. The oecus, if not identical with the peristyle, as some have thought, may be considered to be a larger triclinium, for the purpose of entertaining company; it was, according to Vitruvius, to be made of the same proportions as to length and breadth as the triclinium, that is, twice its width in length. If it was surrounded by a simple row of columns, it was called Corinthian; but if constructed of two orders, the upper closed with windows, it was termed Egyptian, and appeared like a basilica. In either case, the area included was left uncovered for the admission of light. There were oeci which were constructed open towards the north, with a view of the viridarium; they were made sufficiently capacious to admit of two triclinia opposite to each other, and commanded, by windows, a view of the hortus, or garden. The viridarium, or pseudo-garden itself, was occasionally used as a dining-room; for, in that of the house of Actæon, at Pompeii, a triclinium, with its reclining stone benches, and trapezophoron, or table-foot, are visible.

The sacrarium or domestic chapel, was a little private court, in the midst of which stood an altar for sacrifice; and, on the opposite side, a little temple dedicated to the Bona Dea. The lararium, in which the penates were lodged; of these there were four classes, the celestial, marine, and infernal gods, and all demi-gods or heroes who had received divine honours.

* The Romans frequently placed shrubs upon the roofs of their villas, thus forming a sort of hanging garden. See several examples in paintings on the walls of Pompeii.

The extent of the Roman kitchen was enormous, being sometimes no less than 148 feet in length. The decoration appropriated to a kitchen was a representation of the Fornicalia, or festival in honour of the goddess Fornax, who expressly presided over ovens. This favourite subject was surrounded by abundance of fish, flesh, and fowl; with all the various kinds of food required in grand entertainments. Here was found painted on the wall fish ready for dressing, hams, wild boars prepared for the spit, birds, hares, and, in short, every edible thing—not unlike the celebrated Flemish pictures of dead game. The pavement of the culina was a fine black composition, possessing the peculiar property of imbibing water, so that the floor was always dry.

The old style of gardening was strictly Roman, for they clipped their shrubs into forms of animals, pillars, &c. The box, Pliny tells us, "was cut into a thousand different forms; sometimes into letters expressing the name of the master, sometimes that of the artificer, whilst here and there little obelisks rise intermixed alternately with fruit trees."

Of the hydraulics of the hortus, Pliny gives us a pleasant account, when he tells us he often took his supper by the side of a polished marble basin, full of limpid water, but which never overflowed; that this fountain served him for a table, the larger dishes were placed round the margin, and smaller ones swam about, in the form of little vessels and water fowl.

ADHESION OF GLUE.

Mr. Bevan glued together by the ends, two cylinders of dry ash wood, one-fifth of an inch in diameter, and about 8 inches long. After they had been glued together twenty-four hours, they required a force of 1260 lbs. to separate them; and as the area of the circular ends of the cylinders was 1·76 inch, it follows that the force of 715 lbs. would be required to separate one square inch. It is proper to observe, that the glue used in this experiment was newly made and the season very dry; for, in some former experiments on this substance, made in the winter season, and upon some glue which had been frequently made, with occasional additions of glue and water, he obtained a result of 350 to 500 lbs. to the square inch. The present experiment was, however, conducted upon a larger scale, and with care in the direction of the resultant force, so that it might be, as nearly as practicable, in a line passing at right angles through the centre of the surfaces in contact. The pressure was gradually applied; and was sustained two or three minutes before the separation took place. Upon examining the separated surfaces, the glue appeared to be very thin, and did not entirely cover the wood, so that the actual adhesion of glue must be something greater than 715 lbs. to the square inch. Upon comparing with this the natural *cohesive* force latterly of wood of the same kind, Mr. Bevan found it to be only 562 lbs.: consequently, if two pieces of this wood were well glued together, the wood would have yielded in its substance before the glue. From a subsequent experiment made on solid glue, the cohesive force was found to be 4,000 lbs. per square inch; from which it may be inferred, that the application of this substance as a cement is susceptible of improvement.

CEILING.

Illuminated Manuscripts.

By Richard Thomson.

SOME of the Egyptian papyri are magnificent volumes, as seen in the British Museum, comprising the whole funeral ritual, splendidly painted and gilt, and reaching upwards of 65 feet in length. One in the Louvre is remarkable for containing some directions to the illuminator, given by the scribe who wrote the text and traced out the compartments intended to receive the drawings proper to these manuscripts; but as their number and variety were very considerable, the artist is directed as to the subject to be inserted in each, by a small slight sketch placed in the upper angle. In the middle ages the writers of MSS. were, in a like manner, accustomed to insert a small letter for the direction of the illuminator wherever he was to place a painted initial.

The Roman libraries were enriched with MSS. biographies, in which the lives of the individuals were accompanied by their portraits. The work of Varro is said to have contained the likenesses of 700 illustrious Romans. A MS. of Terence, in the Vatican, has illustrations of actors.

MSS. illuminated with silver are rarer than those written with gold letters, as there was an additional expense needed for staining the leaves purple to display the white metal, whereas the MSS. in gold were written both on white and purple grounds.

A marked improvement distinguished the art in the thirteenth century. The gilding introduced in the backgrounds of paintings, borders, and initials, instead of presenting the flat appearance which is to be found in the Byzantine school, was made splendid by being laid on a thick substantial mass, formed of some sticky paste, capable of being polished by an ivory, stone, or metal burnisher, until it looked like a plate of solid metal. The colouring was heightened by fine lines, drawn in white, and with the highest lights inserted in white. The flower-like ornaments were more freely combined, and in the larger initial letters and borders, human shapes, as well as those of animals, are brought in singly or in groups. This practice—now called Historiated—led the way for the more valuable historical illuminations of the next century.

In all the best illuminated MSS. of the sixteenth century, evidence is found of the great advances which had been made in the fine arts. The formality and stiffness of the old style begin to disappear, and all the quaint Gothic features which marked the old specimens are wanting. This brings us to the time of the great illuminator, he may almost be called the conqueror of the art, for it died soon after him—Giulio Clovio. Among the works to which illumination was now applied were those of many classes,—as bible writings of the fathers, church service books, prayer books, legends, histories, poetry, the recovered classics, and almost every kind of document.

A very valuable work is a treatise on the Art of Painting in Oil, Fresco, and Distemper, drawn up about the fourteenth century by Cennino Cennini, a distinguished painter, son of Andrea Cennini, a painter, and pupil of Giotto. As the character of the folding tables, or paintings, and wall-paintings in the churches was much of the character of manuscript illuminations, the instructions of Cennini throw light on MSS. illumination. Indeed, he devotes several chapters of his work solely to such drawings as were to be made on parchment and paper, the use of which latter was becoming commonly known. It has been little remarked that the introduction of paper, besides rendering a valuable service to literature, rendered no less service to art, for the artist got a ready vehicle for his first sketches, and to the architect in particular it gave the means of making plans and drawings. The great expense of employing real gold in illuminated paintings, whether for books or on a larger scale for walls, led to the substitution of leaves of silver, and even of tin, which were laid on with size or mordant, and coloured with saffron, tempered with white of egg. Expensive use was made of both these metals in the decoration of St. Stephen's Chapel and the Palace of Westminster, as well as gold. The Account Rolls of Edward III. contain entries of 22,150 leaves of gold, which are charged 5s. per hundred; 1000 leaves of silver at 8d. per hundred; and 1040 leaves of beaten tin, at 1s. per dozen; which latter entry seems to be a mistake. The trade of gold-beating must have been on some scale then. Tin-beating was most likely an English art, as the great supply of tin was obtained from the Duchy of Cornwall. The men who laid on the gold were paid 5d. per day.

The various paints used by the illuminators are enumerated by Theophilus, Cennino, and other ancient authors. Several whites are named. In the Account Rolls of Edward III., already referred to, white, had for St. Stephen's Chapel, is charged 3d. to 4d. per lb., shewing its enormous value in those days. The yellows were numerous; but the only yellow supplied for the painting of St. Stephen's Chapel was ochre at 1½d. per lb. *Teynt* is, however, supposed to be a brilliant yellow, and is charged 3s. 4d. and 4s. per lb. The reds used were three. Their scarlet was made by mixing vermilion and red lead. Their crimsons were several, and their deep red sinopre or porphyry. The vermilion used for St. Stephen's Chapel cost 1s. 8d. per lb.; the *sinopia* 8s., 10s., 11s. 6d., 20s., and even £3 1s. per lb.; and *brus* or brown 3d. per lb. Purple was largely employed for illumination. The blues were three. Several green colours, both simple and compound, are enumerated by Cennino. Blacks were likewise provided in sufficient variety of material.

From paints to brushes is but a short way, and of these we have some details. For St. Stephen's Chapel there was provided, among other things, "thirty peacocks' and swans' feathers, and squirrels' tales, 2½d.;" "one pound of hog's hair, 1s.;" and "thread to bind the painters' brushes and pencils, 1d.;" and beside seventy quills charged 2½d., and one hundred and fifty-three charged 3½d.

The schools of illumination are, by the French, thus classified:—1. The school founded by Alcuin, at Aix-la-Chapelle; 2. The school of St. Martin, at Tours, likewise founded by Alcuin; 3. The Franco-German school, founded by Drogo, natural son of Charlemagne; 4. The school of Rheims, founded by Archbishop Ebbon, in which are to be found the Byzantine, Saxon, and Italian schools; 5. The German school, founded at the Abbey of St. Gall; 6. The Saxon or English school.

Another classification, after reducing the early schools to two—the Greek and Roman—and leaving out the Egyptian, thus arranges the modern European schools:—

The Greek or Byzantine school—existing from the eighth to the end of the tenth century.

The Anglo-Saxon, the Irish-Saxon, and the Franco-Saxon style of ornament were derived from this school.

The illuminated paintings of Russia belong to this school.

The Early Roman school—from the tenth to the fourteenth century.

The Early Anglo-Norman style was derived from this school.

The Italian school—from the beginning of the fourteenth to the end of the sixteenth century.

The Spanish and Portuguese illuminations belong to this school.

The Early French school—from the close of the fourteenth to the seventeenth century.

The Later English style belongs to this school.

The Flemish, German, and Dutch schools—from the close of the fifteenth century.

The Later French school—the seventeenth and eighteenth centuries.

Architectural Styles.

The great prototype of architecture, nature, has many styles of beauty, and employs them all. The horizontal, arcuated, and vertical, or pointed styles of architecture all find precedent in her domain; and though it could be proved that the Gothic was beyond all comparison superior to any other style in capability of the grander qualities, yet it would be opposed to all natural teaching to claim for it the sole and universal empire.

"Not oaks alone are trees, nor roses flowers."

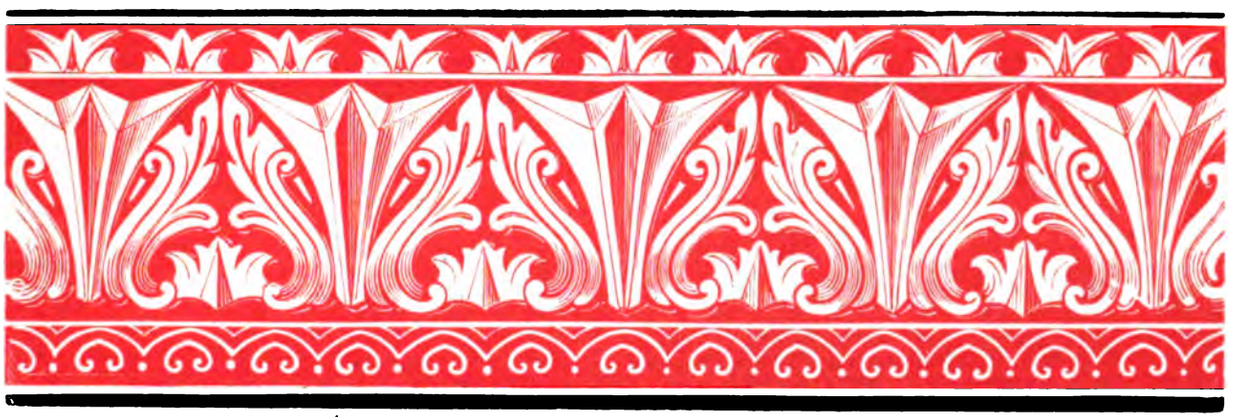
Architectural design should not only not be confined to one style—it should not be confined to any number; for beauty resides not in style, but in a vital principle that existed anterior to all styles, and to which all true styles owe their origin. A building might be so designed as to betray no trace of any style now existing, or that ever existed in the world, and yet be true architecture. It belongs to the very idea of a fine art, as distinguished from the mechanical ones, to yield a boundless scope to the inventive faculties throughout. There is an architectural beauty that will charm the sight and operate upon the mind like ceaseless music, that arises solely from the symmetry of proportion and form, and owes nothing to the trappings of decorative style. I have been charmed by an artistic beauty beaming from erections which are never included in the category of art-works: some of our great chimneys, for instance, from geometrical beauty of plan, elegance of contour, and a soaring height, often display higher qualities, reaching not unfrequently to sublimity, than the majority of church steeples, or other buttressed or columnar erections can lay claim to.

But the Greeks, the Romans, the Goths, and others, we are still told, had but one style. It cannot be denied. But I do not see what we have to do with that, except to be thankful that it is not our case, and that we may have many: perhaps, too, they (the Greeks and the others) would have been glad to see our day of many styles. Perhaps in our plurality of style lies our best chance of going beyond them. A plurality of styles should certainly let us more into the central spirit of architecture than any one style could do. The best Gothic architect, and the best classic architect, is the man who has studied both styles; who has examined the peculiarities, and communed with the genius of all styles. He will best understand the great central art of architecture, which is neither Greek nor Gothic exclusively, but both, and much more; and I feel sure that the universal adoption of any one style to the abandonment of all others would not be progression, but retrogression. It is to be hoped there is too much good sense in England to permit those to succeed who are endeavouring to bring it about.

Supposing it a fact that the truthful expression of our practical purposes and ideas could alone consist with a general uniformity of style; even then I should look with suspicion on the universal taking up of one style; for I would consider general truthfulness most likely to be gained by artists working towards it in their own way from different points, impregnating their work with thought, and being faithful to the suggestions of time, place, material, purpose, and every other circumstance.

It is absurd to urge against the classic styles that they are not indigenous to these islands, for we have surely as much right to import our architecture as anything else. We compass sea and land without rebuke for bodily ailment: why may we not for intellectual and spiritual? What were man's faculties of adaptation and assimilation given him for, if he is to rest satisfied with what springs spontaneously beneath his feet, and may not enrich himself with materials created by superior art-nations and times? The heart and imagination of man, of which architecture is the material exponent, have affinity with all things—with the extant products of ancient art, as well as with the spectacle of external nature; and, by acquaintance with the relics of other times and nations, have become enlarged, and elevated, and refined. What is more reasonable than to expect that a nineteenth-century intellect should have outgrown a native style of architecture, find the development of an ancient or foreign germ more congenial to its taste, and choose it as a medium more fitted to convey the acquired refinements and elegancies of the age, and give utterance to its loftiest poetry?

By its developments in the schools of Italy, it has already proved itself capable, in right hands, of meeting every requirement, civil and domestic, of modern life. In that country the three modes of applying the orders struck out by the great Roman, Venetian, and Florentine architects present us with artistic phases of Classic architecture applicable to every variety of horizontal and vertical section, and for every grade of building—from the warehouse to the mint, from the cottage of the peasant to the palace of the sovereign. They will apply to buildings which are one great undivided hall or interior from end to end, from top to bottom, and are equally applicable to one the most minutely divided—facts which are not contradicted by any examples of Italian architecture in this country; and there is no instance of failure in true fitness or beauty but what may be traced to causes for which the style is not answerable. If a pilastered wall, or colonnade, or columnar window will apply to the purpose of a bank, a corn exchange, a music or guild hall, a revenue building, or offices for mercantile or commercial uses—if they will form and decorate with the utmost artistic beauty the features required by utility, and call for no sacrifice



FRIEZES — BYZANTINE.

INITIALS.

of convenience—what can be urged against the style? What more can be asked from it? What more could any style or element do for us?

There is no true style of architecture but what may be bent to every purpose and adapted to every new requirement and condition—but what has a vital power to lay all other styles under contribution, and absorb and assimilate elements from every source. There is no true style of architecture but what, in right hands, may be as boundless in scope as poetic invention itself.

What Emerson says of nature is true of it. It is not fixed, but fluid. Spirit alters, moulds, makes it. To pure spirit it is volatile, it is obedient. The art-spirit exercised upon it calls it into new life, and brings to it the bloom, the beauty, and the light that enchant it.

This is the condition on which a style of architecture will be found elastic and malleable—that it be not made the sole ingredient of design, but impregnated by the art-spirit; which, while it constitutes any work original, will at the same time make it English and contemporary also; for the true artist, drawing from native sources of inspiration as well as from Classic ones, will breathe into his work the genius and character of his own age and country, and thus change the nature and properties of his architectural materials, as does chymical composition the simple elementary bodies of nature. Beautiful form in itself belongs to all times and all countries. A Corinthian or Ionic column, for instance, is as graceful in England as it was in Greece or Italy, and can never cease to charm the unprejudiced and susceptible spectator. A colonnade must ever gratify the sense of beauty; while it must be useful, also, so long as the sun shines or rain falls. A noble arch or dome as fitly adorns St. Paul's, in London, as it did the Roman Pantheon or temple at Tivoli. The like cannot be said of the impersonations of the Greek allegories, in the sensuous form of Hellenic art, that occupied the ancient niches, which, however admired for their artistic beauty, have lost much of their significance and power, and will not blend with or satisfactorily decorate works, however Classic in their character, that have a proper infusion of the spirit of the day—a fact which nothing could more clearly attest than the gods and goddesses now temporarily placed in the niches of St. George's Hall, Liverpool. The classical myths, such is their majestic significance, will never be void of interest and charm for the educated: they must ever please by their abstract beauty and by that lofty serenity which they breathe, while we shut out from our sight all that is around them, and forget the anomaly of their position among us. But we cannot fail to perceive and feel that they are wanderers from their true homes. We must wish them confined to museums and sculpture galleries as their proper asylums, and their place supplied by what alone can truly decorate our public buildings, namely, sculpture expressive of what is noble and excellent, elevating and refining, in our present life—an embodiment of our history and poetry. It is the material resemblance of the demi-gods of English history—the Spensers, Bacons, Cromwells, Newtons—those whose creations or discoveries, valour or patriotism, have contributed to make Great Britain what she is among the nations—it is these, clad in the dress of the period when their originals moved among us, that can alone appropriately and effectively occupy the niches of our public halls. Such are the sculptural embellishments that will interest Englishmen, and with any style of architecture they may be brought into harmony.—*S. Huggins, Esq.*

Embroidered Bookbinding.

"De Antiquitate Britannicæ Ecclesiæ et privilegiis Ecclesiæ Cantuariensis; cum Archiepiscopis ejusdem 70. An. Dom. 1572," folio. This was printed at Lambeth, by John Day, at the expense of Matthew Parker, the second Protestant Archbishop of Canterbury; who maintained for the purpose limners, wood-cutters, and bookbinders within the palace.

Queen Elizabeth's copy of this very rare volume is now in the British Museum. It is remarkably bound. The material is green velvet, and the embroidery is raised in deep relief with silver thread and foil, and variously coloured silk thread. The colours have generally faded with the exception of the large flowers, which are of a carnation hue. The design evidently conveys a quaint conceit on the Archbishop's name of Parker, the margin of pales indicating a park, containing figures of deer browsing, lodged, springing, and tripping, agreeably to the heraldic taste of that period. The other side of the book presents a similar design, but with variations. The large group of flowers is omitted to make room for an additional deer, which is sleeping, and two snakes. The four other deer are the same as those before us, excepting that the springing one is not looking back. The park-pales differ in a few particulars: the wicket door is open, and there are openings as if pales were broken out in the other part of the gate; the openings at the side are not like windows, but lower (and perhaps represent deer-leaps); in another part some of the pales are omitted to make room for the head of the browsing deer. The back of the book was ornamented with five flowers in squares; but two are now defaced by leather labels.

Dr. Dibdin has devoted a whole chapter of his Decameron (the Eighth Day) to the subject of bookbinding; but he does not make any remarks on this particular style. He only mentions one book, a Psalter, which belonged to Queen Mary, and now in the Bodleian Library, which is "bound with a large flower worked in tambour upon one side of it," and he suggests it may have been Mary's own working. Such suppositions are generally gratuitous; but yet there are two books which appear to have good claim to display the needle-work of the Princess Elizabeth. One of them, the Bodleian MS. 235, is described in Nichols's Progresses of Q. Eliz.; it contains St. Paul's Epistles, with some religious remarks in Elizabeth's writing, and on the cover are mottoes, with a heart and a star worked with gold twist on black silk. The Royal MS. (Brit. Mus.) 7 D. x. may also be fairly presumed to be Elizabeth's work in its exterior as well as interior. It is a volume of Prayers, written on vellum, and addressed to her father. The red velvet cover has, on either side, a monogram apparently composed of the letters R H K N A and E, highly raised in silver-thread, with the letter H above and below, and a rose at the four corners. It is remarkable that a transcript of this volume, probably made by one of the royal family, exists among the MSS. belonging to the King's (or Georgian) Library, its cover being also a copy of the original, only with a new monogram on one of the sides.

The Royal MS. 12 C. VIII. bound in leather, has a loose cover of red velvet, ornamented on each side with the Prince of Wales's feathers, worked with pearls, within a border worked with silver thread. This may possibly have been a cover shifted with the book in use, made

either for Henry Prince of Wales or Prince Charles. The MS. it now covers was presented to King Henry VIII.

Mr. Pickering had a small Bible, 12mo. 1638, the covers of which were worked in silk with tulips and heartsease.

Alloys.

An alloy is a combination of two or more metals. The term is sometimes employed to denote the inferior metal combined with gold or silver. Thus, it is said the standard gold of jewellers is 18 carats of gold and 6 of alloy, whatever metal the alloy may be. When metals are combined either by fusion or cementation, the alloy formed generally possesses properties and characters very different from those of the respective components. The density is sometimes greater, sometimes less; the fusing point in some cases is considerably lower than the mean. Elasticity is sometimes communicated, sometimes destroyed; and the malleability and ductility of the alloy seldom correspond with those of the metals forming it. These important changes would lead to the inference, that alloys are chymical combinations, and not mechanical mixtures; but there are many objections to this supposition, the most important of which are, that metals may be combined in any proportions, and that they may be separated by the process called eliquation, if there is a great difference in the respective temperature of their fusing points. Thus, silver and lead may be separated from copper by heat, the copper requiring a higher temperature for its fusion than the other two metals combined; and an alloy containing a volatile metal, as mercury, or zinc, may be decomposed by a strong heat, the fixed metal remaining when the more volatile is expelled. In many cases a very small proportion of one metal is sufficient to change the most important characters of another. A quarter of a grain of lead will render an ounce of gold perfectly brittle, although neither gold nor lead are brittle metals. If a crucible containing arsenic be placed in the same fire with a crucible containing gold, the fumes of the arsenic will render the gold brittle. Some of the changes thus produced are of the utmost importance in the arts, as many of the alloys are far more valuable on account of the newly-acquired properties, than any of the simple metals. Gold and silver in their pure state, would be totally unfit for the useful purposes to which they are applied, if they were unalloyed, on account of their softness. Even the standard current coin of the realm is alloyed, to render it hard, otherwise the impression would be speedily effaced, and the coin, by abrasion, would soon become deficient in weight. Pure copper would be unfit for many of the purposes to which it is so extensively applied in the arts, if it were not alloyed by some metal to give it hardness; and it is singular that the metals employed for this purpose are all soft metals. Brass, bell-metal, gun-metal, &c., are all alloys of copper with soft metals. Some metals which will not combine together immediately, may be united by the intervention of a third. Thus, mercury will not combine directly with iron; but if zinc or tin is first added to the iron, an amalgam may be formed of it with mercury. It may here be observed, that when mercury is united to any other metal, the compound is called an amalgam. In order to make a perfect alloy, a very intimate admixture, by mechanical agitation, should be effected while the metals are in the fluid state. They should, therefore, be either constantly stirred with an infusible rod, or repeatedly poured from one hot crucible to another. Mr. Hatchett found that the lower end of a bar of standard gold was of inferior specific gravity and value to the upper extremity, which would be formed by the last portions of the metal in the crucible. The surface of metals, also, should be carefully defended, while in the fluid state, from the action of the atmosphere, by a stratum of wax, pitch, or resin, if the fusing point be low; or by a layer of salt, pounded glass, borax, &c., if it be high.

EFFECTS OF A PAPER PATTERN.

A gentleman who was ill of low nervous fever, accompanied by fits of mental aberration, would lie in his bed, with his eyes fixed intently upon the opposite wall, continually muttering to himself, "Fourteen up, thirty-three across—fourteen up, thirty-three across." Notwithstanding the best medical advice, and every other effort that was made for his recovery, he still continued to lie in the same dreamy state, uttering the same words. At length it struck the physician that the incessant reiteration of these words must be connected with some image presented to the mind through the eye. And it further occurred to him that the paper of the room might afford a solution. The pattern of the room consisted of lozenge-shaped figures, which followed each other at regular intervals. On counting these the physician found that the number exactly tallied with the patient's ceaseless refrain, namely fourteen lozenges from the floor to the ceiling, and thirty-three from one end of the room to the other. Acting upon this discovery he immediately ordered the removal of the patient to another room, where the paper was of a totally different pattern. This was done while the patient was asleep, and when he awoke he commenced mechanically with "Fourteen," but suddenly stopped, looked puzzled, and then smiled. From that moment he never uttered the old burden, his recovery came gradually and slowly, and he finally became convalescent. This gentleman used afterwards to relate that he had an indistinct recollection of certain figures which commenced with the lozenge form, but afterwards assumed a variety of shapes and colours, never, however, losing the identity of number, namely, fourteen up, and thirty-three across.

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